This Week in The Iron Age

JUNE 13, 1940

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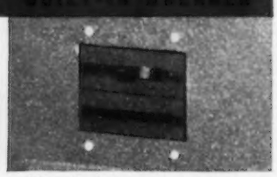

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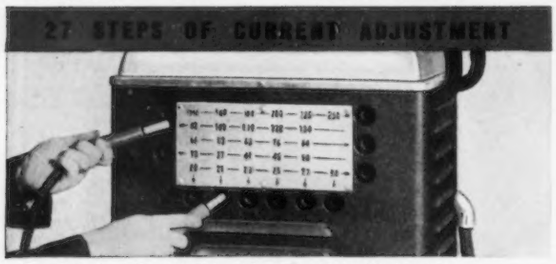

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The Iron Age

JUNE 13, 1940

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Machine Tools & Munitions

A RECENT article in the *Saturday Evening Post* characterized the American machine tool industry as a "war baby" and a "bottleneck." Both of these allegations are wrong and misleading, as was the author's indirect reference to the opinions and statements of the undersigned.

An industrial war baby is one that is born of war, nursed on war and killed by it when war ceases. There have been and always will be such short-lived industries fathered by war.

The American machine tool industry, as an industry, has been in existence for a little less than a century. Before that one could hardly call it an industry. During that time it has been called upon to supply its products for war just three times, not counting the Spanish-American incident. Three times in a hundred years could not be called forming a "habit."

During a war there is a demand for shoes and blankets and canned salmon and thousands of products of every kind needed in quantities by armies, but that does not make these industries war babies. They are just peace babies temporarily recruited to serve military needs. And so, too, is the machine tool industry.

The machine tool industry, even in what we call normal times, faces a widely fluctuating demand from year to year. It is fortunate to go through a 10-year period with three or four profitable years to six or seven unprofitable ones. I do not know of any fortunes built on machine tool making that are at all comparable with those built upon many other industries. With some few exceptions, the ownership and management of the industry are vested in working proprietors who have come up through the ranks from bench or drafting board.

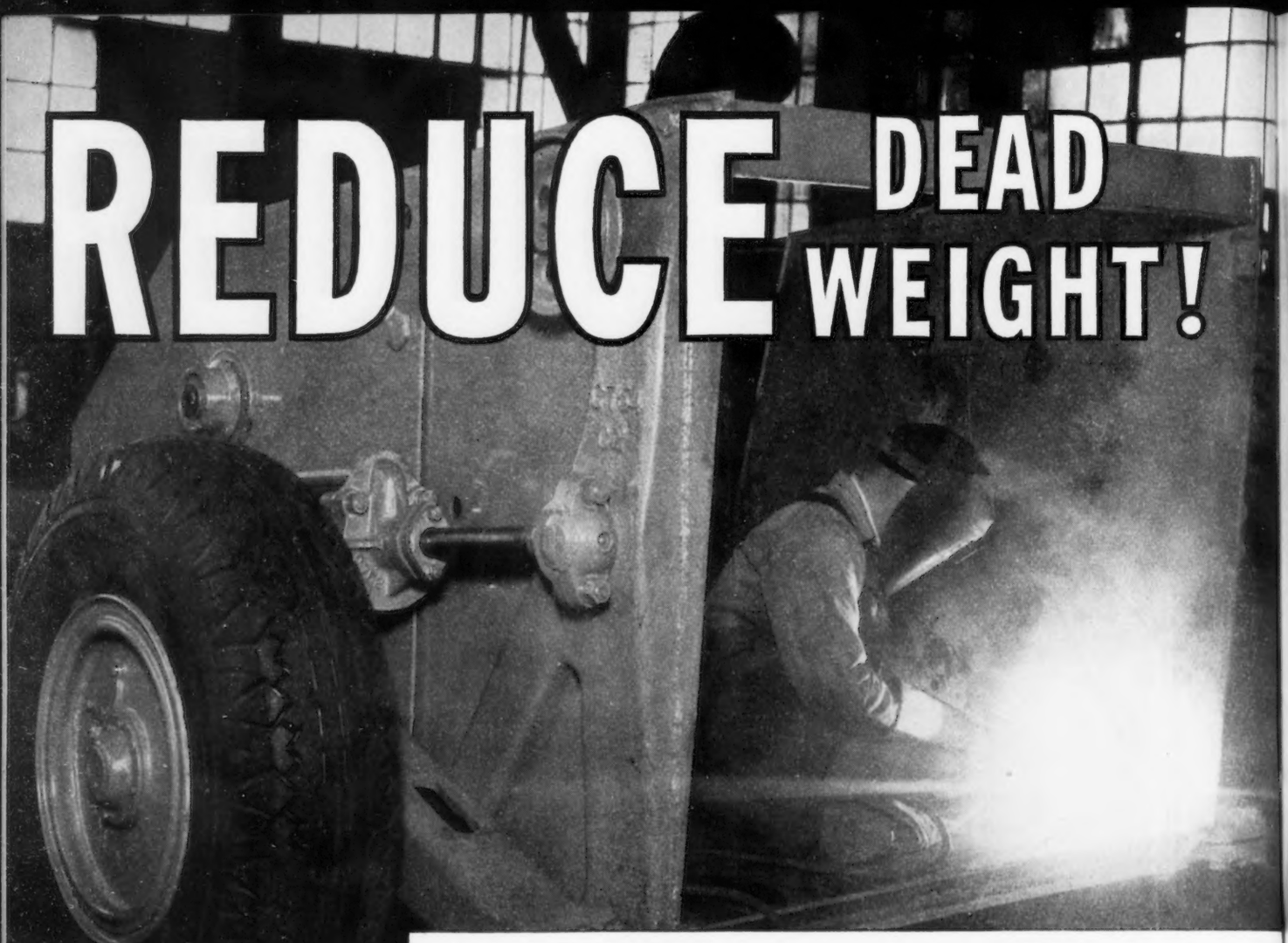
It is true that the industry has been in receipt of large foreign orders for the past several years. But these were not taken at the expense of American customers. The foreign orders are in these shops because American customers, through fear of the New Deal and its works, postponed investment and replacement and permitted obsolescence to creep up.

Even at that, the tool builders have seen to it that hastily awakened American demand has not suffered in deliveries.

One American company engaged in important armament work, for example, by the first of February had placed on order 817 machine tools. On many of these, final instructions and complete information had not been given at the time to the builders. Yet, by the end of April, 820 machine tools had been shipped to this company, including some on later orders. That's performance!

There will be no bottleneck in machine tools if Bill Knudsen is left free to specify priorities to the machine tool committee appointed last week.

J. H. Vanderveer



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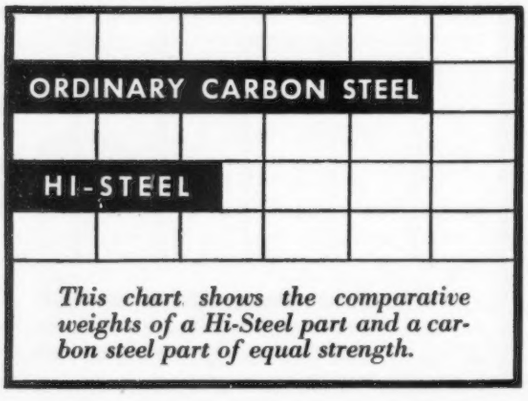

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ALUMINUM ALLOY practice IN EUROPE...

THIS article describes the aluminum casting alloys used in Britain and the Continent, the types of additive elements, and the uses to which such alloys are put. Included is a very informative list of some 70 alloys, their composition and some of their general physical characteristics.

By ERNEST V. PANNELL
British Aluminum Co., Ltd., Bristol, England

WARTIME demands for aircraft and naval construction have led to record consumption figures for aluminum in Europe, practically the entire production being absorbed for these purposes. The bulk of the metal is converted into alloys for casting or working, and a study of these is rendered difficult by reason of the designations given to the various alloys. Not only do these alloys vary in different European countries but different names are used by various producers for identically the same metal, so that a given alloy will sometimes have as many as six names. At the same time one title will not infrequently apply to a group of four or more alloys of different composition, properties and treatment.

To assist in a survey, a list has been appended to this article in which these various titles are shown together with their composition and some note of the origin and uses of the metal. While most of these alloys have some commercial status at the present time a few have been included which have gone out of use, although the names recur in specifications and literature and it is not unusual for an obsolete mixture to be "re-discovered."

A French metallurgist, M. Douchemont, a short time back, introduced a system of classification by which all aluminum alloys were included in six groups according to whether the main addition to the metal was (1) silicon, (2) magnesium, (3) magnesium silicide, (4) copper, (5) zinc, or (6) manganese. The effect and the action of these additions are very different, and it is thought better to detail the added metals in three groups as follows:

(A) ALUMINUM—Practically all light alloys for foundry use contain 75 to 90 per cent of pure aluminum which, while it is seldom cast in a pure form is the basic material.

(B) COPPER, MAGNESIUM, SILICON, ZINC, ETC.—These are added in proportions from 4 to 20 per cent. Without going into metallurgical theory it can be said that in these amounts they strengthen the individual crystals by solid solution or otherwise, at the same time reducing melting point and improving casting qualities and thus producing a simple or normal alloy. Class B additions may also be of the form, zinc-copper, copper-nickel, silicon-copper, etc.

(C) COPPER, MAGNESIUM, LITHIUM, ETC.—These elements are added to a normal alloy as above with a view to heat treatment. These elements in small proportions form compounds such as copper-aluminide, magnesium-silicide, etc., which are capable of being dissolved when heated and precipitated in extremely small particles after quenching. Dispersed in this finely divided form throughout the metal they form "keys" which still further strengthen the crystals and prevent their being torn apart under stress. This effects a marked improvement in hardness, tensile strength elongation, machinability, and other properties.

Heat treatment has been the subject of intense study for the past 25 years and full information on the treatable elements is not complete. Nearly all alloys in this class, however, depend on $CuAl_2$ or Mg_2Si or both. Other metals such as lithium appear to have been introduced into use because magnesium was for a period covered by patent. Class C additions, it will be noted, can be added either to pure aluminum or to Class B normal alloys—the latter is general for foundry work.

(D) MANGANESE, TITANIUM, NICKEL, IRON, CERIUM, CADMIUM, SILICON, ETC.—Small percentages of these elements are often added to a normal or treated alloy with a view to other improvements. For example, a casting of finer grain with somewhat reduced shrinkage follows the addition of manganese or titanium, and the latter appears to accelerate the action of heat treatment. Nickel or manganese will increase the

hot tensile strength of the casting. Antimony or silicon is used to improve corrosion resistance, while tin and antimony give improved machining properties. Furthermore, the interaction between some of these additions and the heat treating elements will occasionally modify the properties of the alloy. Class D components are sometimes added to metals of the normal class which are not treated.

The foregoing statements are summarized in the table below which will be helpful in the study of European aluminum alloys.

CASTING ALLOY GROUPS

A	B	C	D
	Normal Alloy	Treated Alloy	Improved Alloy
Pure Aluminum	Copper	Copper	Manganese
	Copper-Silicon	Magnesium	Titanium
	Copper-Nickel	Lithium	Tin
	Magnesium	Etc.	Antimony
	Silicon		Nickel
	Silicon-Copper		Cadmium
	Silicon-Nickel		Cerium
	Zinc		Chromium
	Zinc-Copper		Iron
	Etc.		Silicon
			Etc.

Any complex alloy can be studied on the above basis. It must be borne in mind that while an aluminum-copper composition is a straight "normal" alloy it can be heat treated, in which case a small percentage of the copper forming the $CuAl_2$ compound can be precipitated thus forming a "treated" alloy although the composition is unaltered. Furthermore, all commercial aluminum contains from 0.3 per cent upwards of both iron and silicon. In a magnesium alloy of Class B, therefore, a small proportion of the magnesium will combine with this silicon, if heat treated, converting it to a Class B-C alloy.

Since most European foundries are working to Government specifications and inspection, rigid control is enforced on quality and foundry conditions. Practice has developed to the point that quite small foundries are now dealing with heat treated and complex alloys. There has in fact been a general leveling-up of technique, especially in England, and the status of casting production has attained a scientific basis during the last 10 years. While many of the proprietary alloys and their treatment are subject to patent, they are quite generally licensed to a number of users on mutually agreeable terms—there is thus no monopoly and the widest use is made of new developments and inventions.

The following table sets out in alphabetical form the aluminum casting alloys, of which most are now in commercial use. It has been endeavored to show duplications where they exist, and also to indicate the sources and uses of the various metals. The composition shown is generally an average figure since analysis varies between maximum and minimum limits. Aluminum is assumed to contain normal amounts of silicon and iron; where these elements are shown they have been added to the normal amount. Physical properties are not quoted because of the great variation in testing methods. Generally tensile strength is from 25,000 to 40,000 lb. per sq. in., elongation from 0 to 8 per cent, and Brinell hardness from 60 to 130. As already indicated, patents exist in most countries covering many of the treated and improved alloys.

While it has not been a general custom in this country to designate aluminum alloys by name, a few American compositions have been included for comparison purposes.

European Aluminum Casting Alloys

ACIERAL

Aluminum	94.7
Copper	2.3
Magnesium	0.1
Manganese	1.5
Iron	1.4

Developed as a cast duralumin by the Baush Machine Tool Co., Springfield, Mass., on patents of A. de Lavandeyra.

AERAL "A"

Aluminum	90.5
Copper	4.5
Magnesium	1.2
Manganese	0.2
Cadmium	1.5
Silicon	2.5

Heat treated, used for cylinder blocks and heads by Wm. Mills, Birmingham, England.

AEROLITE

Aluminum	85.0
Copper	14.0
Manganese	1.0

Piston alloy of high hot tensile strength.

AERON

Aluminum	95.9
Copper	4.0
Lithium	0.1

Heat treated castings formerly used in France. Alternative compositions are also reported.

ALNEON

Aluminum	88.0
Zinc	10.0
Copper	2.0

A normal alloy cast in sand blended with metal particles to give chilling effect, according to the process of Strasser, of Munich.

ALPAX

Aluminum	87.0
Silicon	13.0

The well-known alloy modified with sodium for grain refinement. Developed by Dr. Pacz, Cleveland, Ohio, and other investigators.

ALPAX GAMMA

Aluminum	87.3
Silicon	12.0
Magnesium	0.3
Manganese	0.4

An improved form giving a much higher yield point and higher tensile strength and hardness when heat treated.

ALUFONT II

Aluminum	93.0
Copper	4.0
Silicon	2.0
Magnesium	0.2
Manganese	0.6
Titanium	0.15

A series of improved and heat-treated casting alloys for sand and permanent molds developed by Dr. A. von Zeerleder of the A.I.A.G., Neuhausen, Switzerland. Alufont II is an improved Lautal.

ALUFONT H

Aluminum	84.4
Zinc	12.0
Copper	2.0
Iron	1.4
Magnesium	0.2

Developed as above. Similar to Lynite 145 used extensively in the U. S. in 1921.

ALUFONT W

Aluminum	83.5
Zinc	12.0
Copper	2.0
Silicon	2.0
Manganese	0.5

Developed as above and said to be heat treated but with no outstanding results.

ALUMAG

Aluminum	95.5
Magnesium	4.5

A form of magnalium used by the Trefileries et Laminoirs du Havre, France.

ALUMAC

Aluminum 87.0
Silicon 13.0

Alpax alloy as used for die casting.

ALUMINITE

Aluminum 84.0
Zinc 23.0
Copper 3.0

Developed by W. J. Bruff, New York, but of little commercial application.

ALUSIL

Aluminum 77.5
Silicon 20.0
Copper 1.5
Nickel 1.0

Piston alloy of the hyper-eutectic class designed for low thermal expansion.

ALUVAC

Aluminum 87.0
Silicon 13.0

Alpax as used for die castings by the Fonderies de Precision, Nanterre, France.

ANTOX

Aluminum .....
Zinc .....

A series of alloys having no commercial application.

A. P. 33

Aluminum 95.1
Copper 4.6
Titanium 0.3

Developed by Dr. A. Pacz. Titanium promotes grain refining and accelerates heat treatment.

ARGILIT

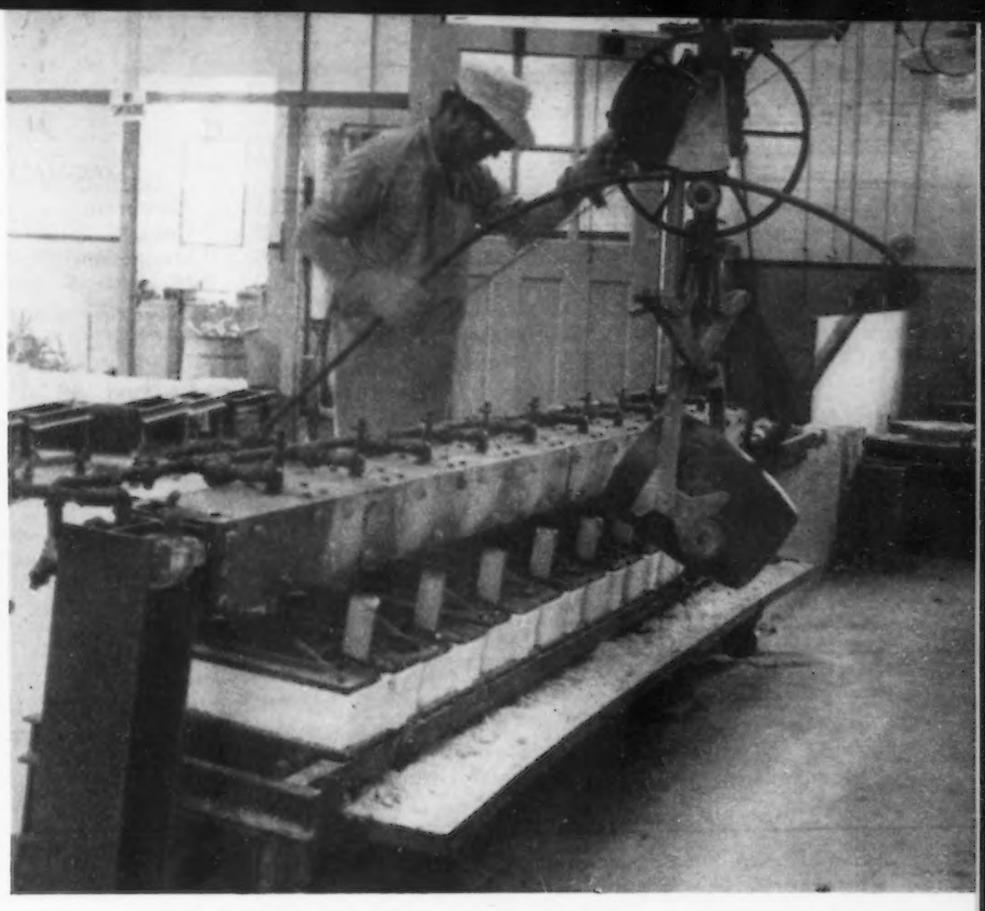
Aluminum 90.0
Copper 6.0
Silicon 2.0
Bismuth 2.0

No present commercial applications are known.

BAUSH A5

Aluminum 91.8
Copper 6.5
Nickel 1.2
Magnesium 0.5

Developed by the Baush Machine Tool Co., Springfield, Mass., for heat treated castings.



Pouring aluminum aircraft parts in plaster molds. o o o

BIRMABRIGHT

Aluminum 95.0
Magnesium 4.5
Manganese 0.5

Extensively used in Britain especially for corrosion resistance. Developed by the Birmingham Aluminum Casting Co., England.

BIRMALITE

Aluminum 89.2
Copper 10.0
Magnesium 0.3
Iron 0.5

Similar to Bohnalite. Used by the Birmingham Aluminum Casting Co., England, for pistons.

BIRMASIL

Aluminum 85.5
Silicon 11.5
Nickel 3.0

A low-expansion alloy with high hot tensile properties developed by the above.

BOHNALITE

Aluminum 88.5
Copper 10.0
Iron 1.2
Magnesium 0.3

Piston alloy as produced by the Bohn Aluminum & Brass Corp., Detroit. Heat treated and widely used in American practice.

CENTRAL

Aluminum 80.4
Silicon 12.0
Copper 2.5
Nickel 2.5
Magnesium 1.2
Manganese 1.2
Titanium 0.2

Piston alloy used for Diesel engines. Heat treated.

CERALUMIN B

Aluminum 94.4
Copper 1.5
Nickel 1.4
Silicon 1.6
Magnesium 0.1
Iron 0.8
Cerium 0.2

One of a group of light alloys patented by J. Stone & Co., Deptford, England. Heat treated and used for intricate castings.

CERALUMIN C

Aluminum 92.7
Copper 2.5
Nickel 1.5
Silicon 1.2
Magnesium 0.7
Iron 1.2
Cerium 0.2

As above but used for cylinder heads and high temperature parts of engines.

CINDAL

An extensive group of alloys developed by D. R. Tullis, of Cindal Metals Ltd., England. All are treated when molten with boron trichloride or other similar compound to produce sound castings for corrosion resistance.

CRANAL

Aluminum 87.0
Silicon 13.0

Alpax as used by the Fonderies et Forges de Crans, Cran Gevrier, France, in production of very large automotive castings in sand molds.

DURANALIUM

Aluminum 93.6
Magnesium 6.0
Manganese 0.4

A heat treated casting alloy produced by the Durener Metallwerke, Germany, for use in conjunction with Duralumin.

DURALINOX

Aluminum	94.6
Magnesium	5.0
Manganese	0.4

Similar to the above but produced by the Societe du Duralumin, Paris.

EUTECTAL

Aluminum	95.5
Copper	1.5
Silicon	0.8
Magnesium	1.0
Manganese	0.8
Titanium	0.4

A heat treated casting alloy developed in France.

FULLER ALLOY

Aluminum	94.5
Zinc	5.0
Magnesium	0.5

A heat treated casting alloy free from copper and of good corrosion resistance. Developed in the laboratories of the General Electric Co.

GAMA

Aluminum	98.1
Nickel	1.5
Magnesium	0.4

A heat treated casting alloy developed in France and intended for high temperature engine parts.

HIDUMINIUM

A series of heat treated alloys developed by Rolls Royce and listed under the designation RR.

HURON

Similar to Baush Metal.

HYDRONALIUM 71

Aluminum	92.0
Magnesium	7.0
Silicon	1.0

One of a large group of alloys developed in Germany and having from 2 to 10 per cent magnesium. Not heat treated.

HYPERSILICON

Aluminum	76.0
Silicon	22.0
Copper	2.0

A low expansion piston alloy.

K.S. 245

Aluminum	78.5
Silicon	14.0
Copper	4.5
Magnesium	0.7
Manganese	0.8
Nickel	1.5

A heat treated piston alloy developed by Karl Schmidt, Neckarsulm, Germany.

K.S 280

Aluminum	72.6
Silicon	22.0
Copper	1.5
Magnesium	0.5
Manganese	0.7
Nickel	1.5
Cobalt	1.2

Similar to the above but designed for minimum thermal expansion.

LAUTAL

Aluminum	94.0
Copper	4.0
Silicon	2.0

A useful normal alloy for both casting and working developed by the Vereinigte Aluminium Werke, Lauta, Germany.

LOEX

Aluminum	82.2
Silicon	14.0
Nickel	2.0
Copper	0.8
Magnesium	1.0

Heat treated piston alloy designed for low thermal expansion and ease of machining. Developed in America.

LYNITE 145

Aluminum	86.3
Zinc	10.0
Copper	2.5
Iron	1.2

One of a group of casting alloys designed to achieve high strength by the use of iron. Now only in limited commercial use.

MACADAMITE

Aluminum	84.0
Zinc	13.0
Copper	3.0

Developed by W. J. McAdam in Detroit but little used in American practice.

MAGNALITE

Aluminum	94.7
Copper	2.5
Magnesium	1.3
Nickel	1.5

Used for pistons by W. M. Levett in New York before the development of "Y" and "RR" alloys.

MAGNALIUM

Aluminum	95.0
Magnesium	5.0

Used for foundry work by the Westinghouse Electric & Mfg. Co. and others in 1920 but later discontinued.

MIRALITE

Aluminum	87.0
Copper	12.0
Tin	1.0

A British piston alloy no longer in commercial use.

M. V. C.

Aluminum	89.0
Silicon	11.0

A form of Alpax developed by the Metropolitan Vickers Co. of Trafford Park, England.

NEONALIUM

Aluminum	90.0
Copper	10.0

A normal alloy molded with metal blended sand to secure greater chilling effect when cast. Developed by Strasser in Munich.

NOVALITE

Aluminum	85.0
Copper	12.5
Magnesium	0.3
Manganese	1.4
Iron	0.8

A piston alloy formerly used commercially in Germany.

NURAL 43

Aluminum	93.8
Silicon	5.0
Iron	1.2

One of a group of casting alloys developed in Germany but with no original features.

PACK ALLOY

Aluminum	90.5
Copper	4.0
Nickel	4.0
Silicon	1.5

Developed by the Doehler Die Casting Co. for die castings.

PANSERI ALLOY

Aluminum	82.6
Silicon	11.5
Nickel	4.5
Copper	1.0
Magnesium	0.4

Piston alloy developed in Italy by C. Panseri.

PANTAL 5

Aluminum	93.8
Silicon	5.0
Magnesium	0.6
Manganese	0.6

Used in Germany for heat treated sand and permanent mold castings.

QUARZAL 5

Aluminum	94.0
Copper	5.0
Iron	1.0

European alloy stated to be used for bearings.

QUARZAL 15

Aluminum	78.0
Copper	15.0
Manganese	6.0
Iron	1.0

Piston alloy in the same class as the above.

R. A. F. PISTON ALLOY

Aluminum	88.9
Nickel	5.0
Manganese	3.0
Copper	2.0
Magnesium	0.5
Chromium	0.5
Titanium	0.1

Developed by H. Sutton and others at the Royal Aircraft Factory for high hot tensile strength.

RR 50

Aluminum	93.9
Copper	1.3
Magnesium	0.1
Iron	1.0
Silicon	2.2
Nickel	1.3
Titanium	0.2

One of the Hiduminium alloys developed by Hall

and Bradbury of the Rolls Royce Co., Derby, and promoted by High Duty Alloys, Slough, England. Used for sand castings and heat treated.

RR 53

Aluminum	92.1
Copper	2.2
Magnesium	1.6
Iron	1.4
Silicon	1.3
Nickel	1.3
Titanium	0.1

As above but used for permanent mold production.

SEEWASSER

Aluminum	95.0
Magnesium	2.3
Manganese	2.5
Antimony	0.2

Developed by Karl Schmidt of Neckarsulm, Germany, for resistance to marine corrosion.

SILUMIN

Aluminum	87.0
Silicon	13.0

Similar to Alpax; German designation.

STALANIUM

Aluminum	92.0
Magnesium	7.0
Antimony	0.5

Similar to Hydronalium; designed for good resistance to corrosion.

STAY ALLOY

Aluminum	88.9
Copper	11.0
Titanium	0.1

Introduced by T. D. Stay of the Alumnium Castings Co., Cleveland, for permanent mold castings with close grain.

SUPRA

Aluminum	73.0
Silicon	20.0
Copper	4.5
Manganese	1.8
Iron	0.7

A hypereutectic alloy for low expansion pistons. Claimed to have self-hardening properties.

SYLCUM

Aluminum	81.8
Silicon	9.0
Copper	7.3
Nickel	1.4
Manganese	0.5

A piston alloy developed in Germany for hardness and low expansion.

THALASSAL

Aluminum	95.0
Magnesium	2.3
Manganese	2.5
Antimony	0.2

Similar to K. S. Seewasser; used in French practice.

TITANAL

Aluminum	81.9
Copper	12.3
Silicon	4.3
Iron	0.7
Magnesium	0.8

A piston alloy developed in Germany and heat treated.

VERILITE

Aluminum	95.5
Copper	1.0
Nickel	1.5
Chromium	1.5
Magnesium	0.5

Heat treated alloy designed for corrosion resistance.

WILMIL

Aluminum	87.0
Silicon	13.0

Similar to Alpax. Developed by William Mills Foundry Co., Birmingham, England.

Y ALLOY

Aluminum	92.5
Copper	4.0
Nickel	2.0
Magnesium	1.5

Developed in England for heat treated motor pistons and cylinders having high hot strength. Now partly superseded by RR alloys.

Z 3 ALLOY

Aluminum	87.5
Copper	7.0
Zinc	3.0
Silicon	2.5

A foundry alloy for general work produced by the Birmingham Aluminum Casting Co., England.

A survey of the foregoing list of 70 alloys shows that it could be reduced to less than half if duplications were eliminated. Small differences of analysis are indicative of the individualistic attitude of producers and foundries, but these are gradually being leveled out by the standardization called for under Government control. As regards nomenclature, it must be admitted that distinctive names give a better picture of different metals and are at the same time more easily memorized than numbers. The many compositions of foundry alloys in use containing small amounts of magnesium, manganese, chromium and similar elements are explained by the fact that much of the metal coming into the foundries is scrap from aircraft sheet metal shops. These elements are kept under analytical control, however, and afford a simple means of producing castings for heat treatment.

Chromium-Silicon Cast Iron

A RECENT paper before the British Cast Iron Research Association, by A. L. Norbury and E. Morgan, gives a survey of the microstructures, tendency to chill, mechanical properties (such as Brinell hardness, machinability, tensile strength, transverse strength, deflection and repeated impact values) and air and oil hardening capacities of cast irons having chromium contents between 0 and 15 per cent and silicon contents between 1 and 11 per cent.

The conclusions from the results may be summarized as follows: (1) 1 per cent of 69 per cent ferrochromium added to crucible melts increased the chromium content of the resulting cast on an average by 0.6 per cent; (2) increasing the chromium content stabilized the pearlite and secondary cementite and caused white-iron eutectic to replace graphite, but did not cause self-hardening or the replacement of pearlite by martensite; (3) in cast irons of normal total-carbon content, the chill producing action of 1 per cent of chromium neutralized the chill reducing action of about 1 per cent of silicon; (4) chromium increased the Brinell hardness and reduced the machinability. In most compositions it increased the mechanical strength and reduced the deflection; (5) as the chromium content increased, the white-iron eutectic assumed the form of carbide crystals in a ferrite matrix, instead of austenite globules in a carbide matrix; (6) experiments not included in this paper showed that chromium raised the freezing point of the white-iron eutectic.

Copperweld Goes

WITH electric furnace alloy steel consumption at new peaks, **Copperweld Steel Co.**, Warren, Ohio, joins the parade of alloy steel makers with an experienced personnel, modern electric furnace melt shop equipment and practice, completely reconstructed rolling mills and plenty of wide open space for future expansion.

Present capacity for making all grades of alloy steels at the Warren plant approximates 12,000 tons of ingots a month, while the rolling mill equipment is capable of finishing about 20,000 tons of alloy steel products a month.

The Warren plant will furnish to the Glassport, Pa., plant the steel used in the manufacture of Copperweld (copper covered wire and rods), but Glassport requirements will not exceed 20 per cent of the Warren plant capacity. Frederick J. Griffiths, whose history as well as that of other executives appears elsewhere in this story, was given a free hand in building up the new steel plant to a degree that would put it in position to make, serve and research the best in alloy steel production.

It is expected that when full time production is obtained Copperweld will employ approximately 600 employees. In line with present day trends, the company has built a centrally located metallurgical and chemical laboratory, housing the latest equipment available for the testing of steel. There is also an etch house near the billet storage building for macroetching billets and bars.

Copperweld is manufacturing all grades of SAE alloy steels in automotive and electric furnace quality including oxidation and corrosion-resisting steel, aircraft quality steel, tool and special steels and stainless steel.

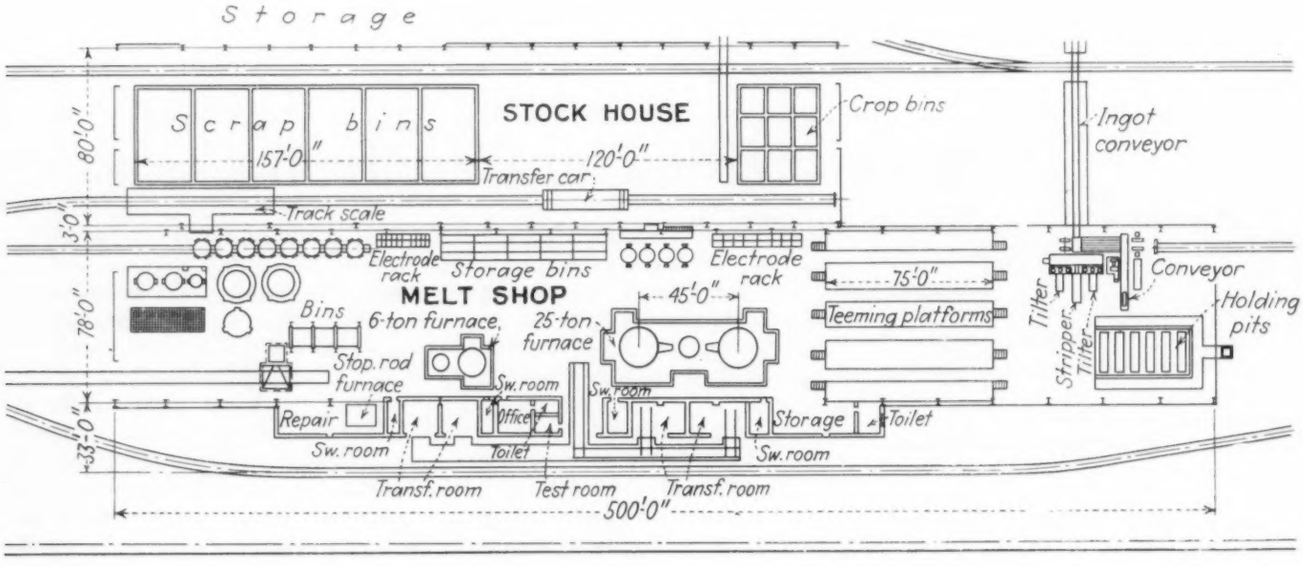
Each of the two 25-ton Swindell-Dressler electric furnaces are serviced by a 12,000 k.v.a. Westinghouse transformer which has a range of 10 secondary voltages permitting full flexibility from the rapid melting of light scrap to the holding and refining voltages. Each of these electric furnaces will make average heats of 35 net tons. A 6-ton Heroult electric furnace completes the present melt shop setup.

A desirable safety feature on the 25-ton furnaces is obtained by having the flexible cables water cooled and insulated from one another by rubber hose containers. This setup reflects compactness and a new feature of rubber ball flexibility is used.

The furnaces are claimed to be the largest using top charging, and the combination of a swinging roof with a four point suspension is considered to be unique in this design. This latter feature has reduced or eliminated the heavy stress on roof refractories, and the four point suspension of the roof makes changing of it a simple and rapid progress, especially since all roofs are interchangeable.

Operation of the lift and swinging roof is carried out smoothly by the use of a heavy oil hydraulic lifting ram into which is incorporated a transverse oil hydraulic cylinder for swinging in both directions. These rams are interlocked and one lever operates the whole system. The oil system is of low pressure type and each is interconnected.

Working bottoms of the furnaces are lined with Ramix, a prepared magnesite refractory made by Basic Dolomite, Inc., Cleveland. This material when mixed with water and rammed into place, air-sets to a dense, monolithic mass. Possible damage to the electric furnace roof through burning-in the bottom lining at high tempera-



Layout of the new Copperweld melt shop

Alloy...

By T. C. CAMPBELL
Pittsburgh Editor, The Iron Age

ture, is thus avoided. Under furnace operating temperatures, the material develops high resistance to slag and metal penetration, chemical attack and erosion.

Advantages claimed for the material include reduced maintenance, longer hearth life, and faster production due to the reduced conductivity of Ramix.

The charging of the furnace is accomplished by two drop bottom buckets and the time element is short because the raising and the swinging of the roof takes only 30 sec. in each direction. The scrap drop buckets have sectional bottoms kept in place by rope which burns when the bucket is in position on the top of the furnace thus releasing the scrap.

The "balance" of the electric furnace setup is so accurate that an immediate response from the regulator to the electric arc in both directions is permitted. This, more than any other feature, assures accuracy of temperature and the proper reactions between the slag and steel bath. The electrode travel is almost twice as much as in previous practice which, it is claimed, reduces to one-half shut-downs for electrode slipping.

The high electrical input of these two electric furnaces brings about the "melting down" of the whole charge within one hour. Refining is then carried out under the available flexible inputs and "under the slag" pouring is utilized to maintain metallurgical cleanliness.

The entire melt shop layout is compact, and the entire technique from scrap storage and handling to ingot stripping is accomplished with a minimum of time and operations. Two 14-in. ingots, each weighing 2100 lb., are poured simultaneously from a double-nozzle ladle. A feature of the melt shop equipment is a newly designed ingot stripping machine built by Morgan Engineering Co., Alliance, Ohio. The equipment consists of two ingot mold tilting machines, one 100-ton stripper and an ingot mold car. The ingot mold tilting machines and stripper are hydraulically operated through a motor driven oil hydraulic unit and the ingot mold car is operated on a track by chain drive and electric motor.

Controlled by one operator from the operating pulpit, the cycle of operation is as follows: After molds have been poured, they are transferred from the pouring platform, three at a time, by an overhead crane with multiple hook bale, and deposited in a vertical position on the first ingot mold tilting machine. The tilting machine is provided with an automatic clamping device which locks the molds to the tilting frame. The ingot tilting machine then deposits the three loaded molds in a horizontal position on the ingot car.

The ingot car conveys the molds to the stationary stripper. The molds automatically engage with the stripper head and are stripped, one at a time, by the stripper plunger. The stripper has two cylinders with telescoping plungers with a stroke of 6 ft. It is designed to provide rapid push out and return motions after ingots have been loosened from molds.

While the ingots are being stripped, the first ingot tilting machine is returned to an upright position and receives the second group of loaded molds by crane from the pouring platform.

After stripping, the ingot car further conveys the empty molds to the second ingot tilting machine. The molds automatically engage the clamping device and the tilting machine returns the empty molds to the original

Copperweld's New Plant at a Glance

ELECTRIC FURNACES—Two 25-ton removable top furnaces (charge 35 net tons), each with 12,000 k.v.a. transformer. One 6-ton Heroult furnace. Total capacity for melt shop is 12,000 tons ingots a month.

STOCK HOUSE—Last word in scrap segregation and swift handling. Scrap buckets discharge scrap in furnace when rope on bottom burns.

POURING PLATFORM—Modern arrangement for double pouring from each ladle. Each ingot measures 14 in. and weighs 2100 lbs.

INGOT MOLD STRIPPER—Totally new design in ingot mold stripping (see article for details) three molds brought to stripper at one time.

BLOOMING MILL HEATING FURNACES—Three side door furnaces, newly designed, having ten burners in rear wall and built so the incandescent gases envelope the ingots. (See article for details.)

BILLET HEATING FURNACE—One continuous pusher type having two firing zones, preheat and soaking. Gases can be exhausted independently from either firing zone.

BLOOMING MILL—One 29-in. three high bloomer, 1500 hp., 2300 volts, a.c. motor.

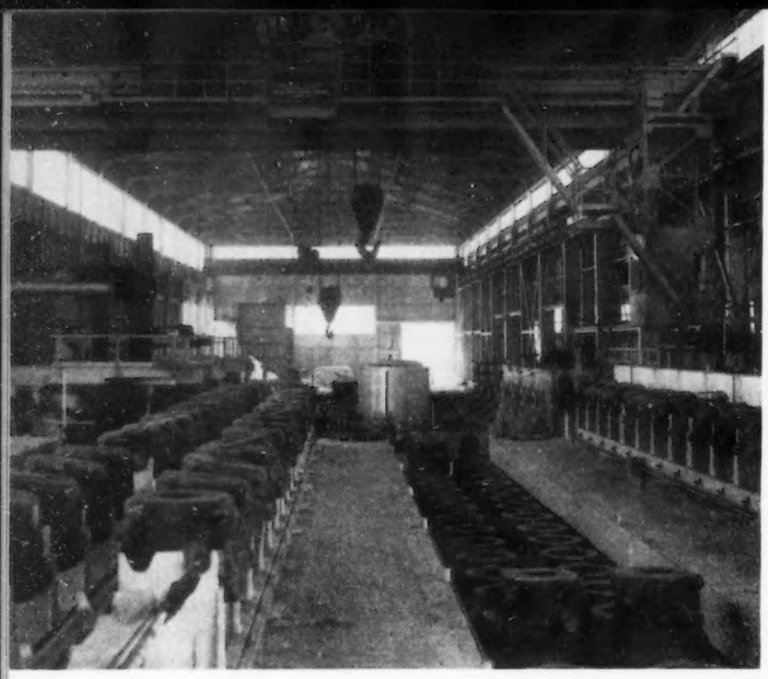
24-in. BAR MILL—With both shearing and hot saw equipment. Has pit capacity for slow cooling of billets or bars, 1200 hp., 2300 volt a.c. motor. Products from this mill go to cooling bed thence to billet storage building where cooling pits, pickling tanks and cleaning equipment are located.

18-in. BAR MILL—Two 3-high and one 2-high stands with hot saw equipment. This mill has large cooling bed and additional slow cooling pits.

12-in. and 9-in. BAR MILLS—Five stands of 12-in. and two stands of 9-in. with double cooling bed 210 ft. long and two rod reels.

LABORATORY—Completely equipped to make every required test and inspection of alloy steels.

PRODUCTS PRODUCED—Billets and bars from one-half inch to eight inches by rolling and larger or irregular sections are pressed.



AT LEFT
View of melt shop from pouring platform toward furnaces.

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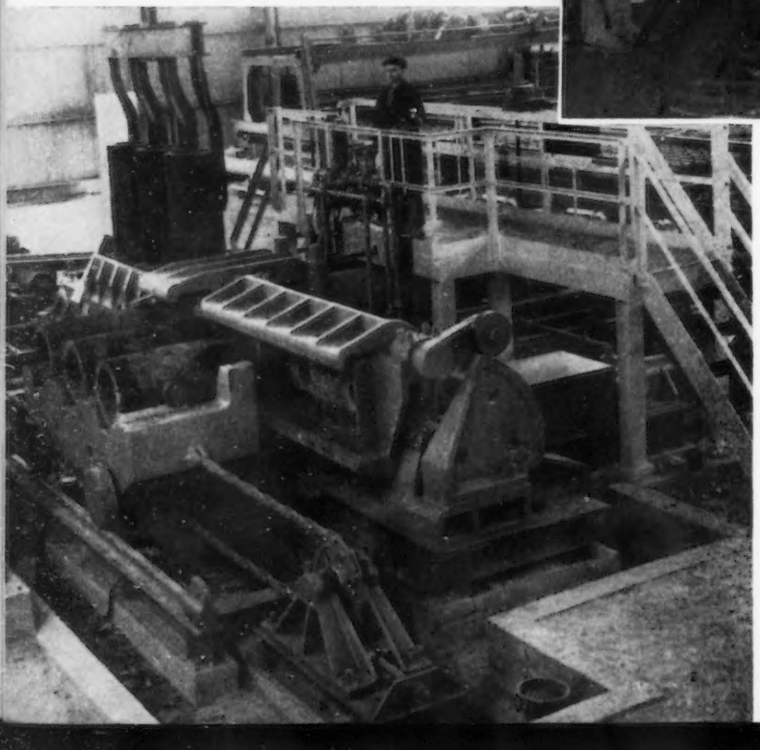
BELOW
Alloy heat being poured, using two nozzles.

upright position. The three empty molds are returned to the pouring platform by crane, completing the cycle of operation.

After leaving the stripper the alloy ingots, unless stored in the melt shop holding pits, are conveyed underground to the blooming mill heating furnaces. Heating of the ingots is accomplished in three double chamber, side door furnaces, of a new design. Pennsylvania Industrial Engineers, Pittsburgh, in designing these furnaces adopted a new method of firing by building a battery of 10 burners in the rear wall which throw a luminous flame under the arch towards the door. Flues are arranged to draw the incandescent gases in front of the doors and back through the rows of ingots. An unusually uniform heating results and the furnaces are controlled for atmosphere, temperature and pressure.

Pennsylvania Engineers also installed a continuous pusher type furnace at the company's 18-in. bar mill. This furnace has two zones of firing, preheat and soaking, with means, if desirable, to exhaust gases independently from either firing zone. This arrangement makes it possible to use only one firing zone if the charge is small and in this case either the preheat or soaking zone can be used for full and proper heating of the bars.

Rolling mill equipment at Copperweld includes a 29-in. blooming mill, a 24-in. bar mill, an 18-in. bar mill, a 12-in. bar mill and a 9-in. bar mill, details of which are shown elsewhere in this article. United Engineering & Foundry Co. furnished rolls and roll pass design.



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AT LEFT
New type stripper for alloy steel ingots.

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The entire designing and engineering of the Copperweld plant was under the direction of Griffiths-Bowman Engineering Co., Cleveland, while the construction work was carried through in record time by Uhl Construction Co.

The working floor area under roof, in modern daylight buildings, and completely served by cranes, is over 320,000 sq. ft., equivalent to aproximately 7½ acres.

Press Operation Revamped

THREE major objectives were uppermost in undertaking the redesign of a press used to cut blanks into rotor and stator laminations for a.c. motors in the plant of the Reliance Electric & Engineering Co., Cleveland. The operation is what is known as "separating," or parting with a die, a rotor and a stator lamination from each blank fed into the press.

The first consideration was to provide greater protection for the operator who in the original setup had to insert and remove the blanks by hand from beneath the dies. The second consideration was to develop an automatic means of segregating and stacking the rotor and stator sections of each blank as these emerged from the separating operations. The third consideration was to increase the output of the press sufficiently to make it feasible to operate it as an integral part of a smoothly moving production line.

The blanks come to the separating press from other stamping operations which have provided (1) the proper sized shaft hole, (2) the correct outside diameter for the finished stator, and (3) a succession of notched openings around the periphery of the blank which will serve as the coil slots in the stator lamination. The separating operations performed by the revamped press follows this notching of the stator coil slots, and precedes the assembly of the stator laminations into finished stator frames.

In the original operation of the separating press the blank was placed by hand over a plug in the center of the die, and the press clutch tripped. After the press had operated, the stator section dropped out of the back of the press and into a tote pan; but the rotor section had to be pried off the plug in the die—again by hand.

Both types of laminations then had to be picked up by hand, separated into two stacks and lined up—both as to index keyways and as to the proper side up with relation to the press burrs which had been raised. This operation, again, was necessarily a slow one and offered considerable hazard to the operator's fingers and hands.

To eliminate the hazard incurred by the presence of the operator's hands beneath the press dies, the construction of the dies was revised so that blanks are now fed into the press through a chute, and are mechanically positioned beneath the dies by the use of stops. Knockout rings and pins were introduced to automatically strip the rotor sections from the die following the separating operation.

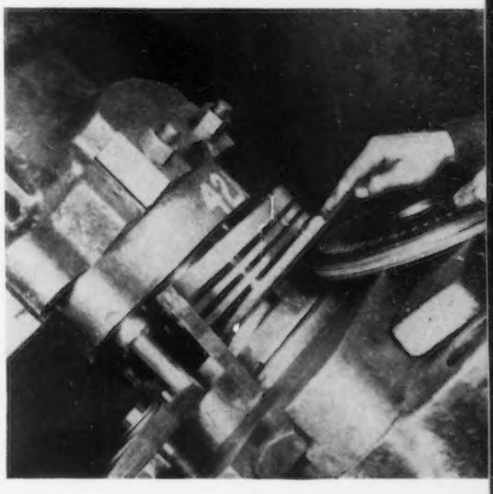
The rotor lamination drops out of the die and down the discharge chute under the corresponding stator lamination. A hole, cut in the discharge chute in the back of the press, allows the rotor lamination (the smaller piece) to drop through into a separate, lower chute. The stator lamination (of larger diameter) slides on down the upper discharge chute.

The stator laminations are picked up on a moving rubber conveyor belt and carried to a stacking unit as shown in an accompanying illustration. Stacks of lined-up stator laminations can be removed from the spindle without stopping either the press or the stacker and are weighed on a scale into piles of the correct size to produce finished stators.

The rotor laminations as they slide down the lower discharge chute are tilted on edge, rolled sideways and picked up by another rubber belt conveyor which carries them up and onto spindles on which they are simply stacked until removed to be notched as required by the specifications of motors going into production at the time.

The complete press, conveyors, and stacking unit are used to handle blanks up to 16 in. in diameter. For larger size blanks up to 22 in. in diameter, the rotor sections are handled as previously described, but the stator laminations, being too big to pass back through the press, are taken out of the dies at the front and are shoved down a special chute provided along the outside of the press. This chute carries them to the stacker unit previously described. Because of the large size of these laminations removing them by hand does not represent the hazard involved with the smaller sizes, but is naturally slower.

The output of this press has been doubled as a result of the foregoing innovation.



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OPERATOR feeds blanks into chute (above) which automatically "positions" them in the press. (Right) Stator laminations come off conveyor in foreground. They can be removed from stacker without interrupting the press.

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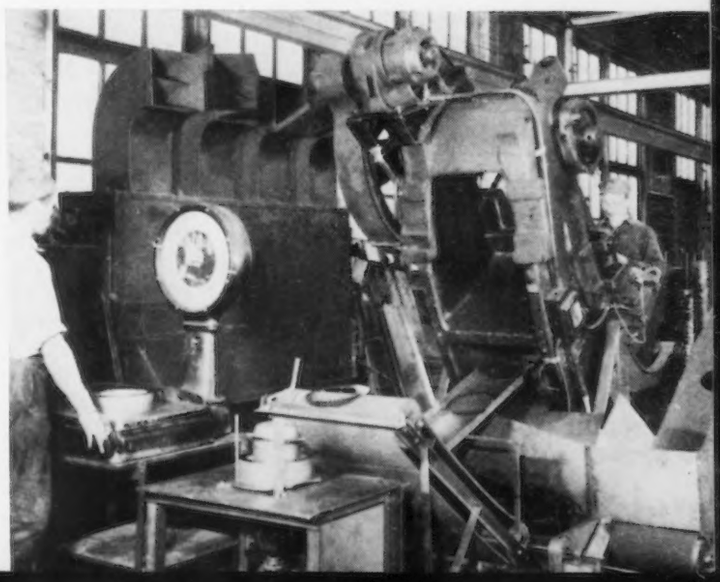


Deep Drawing Tests for Sheet

STRETCHER Strains: In regard to the development of stretcher strains certain points of interest were revealed by an examination of a series of partial pressings produced at the slower rate of drawing. During the very early stages of drawing stretcher strains appear in an intersecting spiral formation on the flat rim of the blank. As the drawing proceeds and the strains become greater these particular stretcher strains disappear, while another system, based generally on the longitudinal and transverse axes of the strip, appears in the flat base of the cup. At a later stage this system disappears in turn, leaving a clean surface. As mentioned above, this latter formation of stretcher strains is not independent of the rate of drawing. The stretcher strains are characteristic, of course, of the state of actual yield in the mild steel and therefore of strains not exceeding about 3 per cent. Strains of this order occur in the rim at a very early stage, and as soon as they become greater the stretcher strains begin to disappear. Strains in the base of the cup arise as the tension in the cylindrical portion of the cup draws metal round the radius at the head of the punch, and are probably more fortuitous than those in the rim, depending on the punch radius, conditions of lubrication, and also evidently, on the speed of drawing.

As the blank diameter is increased with any particular punch radius the stretcher strain figures found on the base of the cup show greater development up to a certain point, but tend to disappear at still greater diameters. This indicates that, with small blanks, the base of the cup only just reaches the yield point; with larger blanks the strain corresponds to the full yield; and with still larger ones the strain has passed beyond the yield into the stable plastic range.

Inspection of cups produced from a given blank diameter by means of punches of various radii shows that the stretcher strains are more fully developed, or in the case of the larger blanks have more completely disappeared, when the punch radius is large. This observation confirms that the strains are more readily transmitted over a gradual curvature on the punch.

These observations suggest that it may sometimes be possible to avoid stretcher strains in practice by allowing the affected part greater freedom to strain so that it has completely passed through the critical stage by the end of the pressing operation.

In this connection it is of interest to note that no obvious stretcher strains were detected at any stage on the radiused portions of a pressing, although the material in these regions must necessarily pass through the critical range of strain.

The reason underlying this result explains the efficacy of roller leveling as a preliminary stage to commercial drawing operations. In the process of bending the various layers in the strip or sheet pass through the yield point at different stages, and the stretcher strains develop locally, and in much finer form than when the whole thickness of the material passed through the yield point at the same time. Careful inspection of roller leveled sheet reveals minute and, therefore, quite unobjectionable stretcher strains, and in material bent in the experimental sub-press these merely produce a slight sand-blasted appearance on the surface. An analogous effect is found when passing through the yielding stage in a torsion test.

Lubrication

In order to examine the effect of lubrication, it was decided to employ, for exploratory purposes, a single diameter of blank (4.0 in.) and a single speed of drawing (1½ in. per min.), and to compare results on the basis of autographic diagrams and maximum punch loads.

In a series of preliminary tests using mild steel blanks, it was found that the lowest punch loads among eight representative lubricants tested were given by those containing graphite, either in the dry form or as a finely divided suspension in water.

In an endeavor to explain and ascertain the range of efficacy of graphite, tests were made on mild steel blanks of larger diameter and at various speeds.

It was found that blanks 4.25 in. diameter drew successfully at all speeds with a maximum load of slightly under 13,000 lb., and blanks 4.3 in. diameter at loads of about 14,800 lb. Blanks 4.4 in. diameter failed to draw at any speed. Graphite improves the drawing properties of mild steel markedly at slow rates of drawing, and slightly at the higher rates approximating to commercial

METAL...

By Prof. H. S. Swift - M.A., D.Sc.

ANY data on dependable testing procedure for determining deep drawing qualities of metals are extremely timely. Therefore, this informative treatment of the problem by Professor Swift has brought forth enthusiastic response in England. In the first part of this article last week, the author discussed cupping tests and the drawing test, and described the autographic sub-press devised for the deep drawing tests. Herein, in conclusion, data are presented on stretcher strains, and considerable experimental work on the important subject of lubrication is correlated.

practice. At the same time, the speed effect, which was noticeable with grease lubrication, disappears with graphite. The reason for this is probably quite a simple one. The film of grease between the blank and die tends to be expelled under the high interfacial pressure and the drawing action, while the graphite, being of a more solid nature, resists expulsion and is rather pressed into the surface of the blank. In the mechanism of expulsion of the grease film there is a time effect; the slower the drawing process the more complete the expulsion will be. Hence the grease film is less impaired at high speeds and more efficient lubrication is provided. This time effect does not exist with the graphite, which maintains a film under all conditions of speed. The fact that another solid lubricant (french chalk) was unsatisfactory is due, no doubt, not to its expulsion, but to its poorer intrinsic lubricating properties.

The essential function of lubrication on the underside of the blank is to reduce the friction over the radius of the die ring B (Fig. 3), so that the radial tension necessary to produce the radial drawing of the blank is not augmented unduly as it is transferred round the radius of the die into pure tension in the cylindrical portion of the cup B C. Hence, lubrication on the radius B reduces the tension in the portion of the pressing most liable to break, and also the load required for the punch. Hence, either larger blanks can be pressed or lower punch loads are necessary.

The effect of lubrication between the blank and blank-holder in the region A and D is to reduce the radial tension to some extent; but since, as has been shown, the punch load is not appreciably increased by the considerable ironing due to deficient blank clearance and since the lubricating film is most likely to persist near the trailing outer edge A D of the blank, the conditions in this region are not likely to be very important.

The other region at which the condition of the upper surface is important is that at E, where radial pressure may be exerted by the punch in forming the curvature over the radius of the die, and where an additional pressure is induced if, and when, ironing commences at B E. Since the cylindrical portion E F of the cup is tending to draw out during the whole pressing operation, there will be a small but positive slip between the surfaces of the cup and punch, and any pressure between the two will introduce friction which, as already explained, will tend to concentrate in the region E. This friction will not affect the radial tension causing the radial drawing in the flange between D and E, but will supply some of the force necessary to provide this tension, and will therefore relieve the cylindrical portion of the cup E F to this extent.

If the pressure and adhesion at E were sufficient, there would be no need for any tension at all in the cup itself, and the whole of the punch load would be transmitted to the blank at E where its thickness is greater than at F, and it is therefore more able to sustain the load. The actual value of the punch load, however, would not be affected whether it were transmitted at E or F, or distributed between the two.

This picture of the mechanism of lubrication in the drawing process explains the experimentally established facts that, when the bottom is lubricated in a definite way the drawing load is independent of the condition of the upper surface; when the bottom is unlubricated, the drawing load is greater, but, again, independent of the condition of the upper surface; with a good lubricant on the upper surface, the cup will break at a punch load which it is capable of sustaining with an inferior lubricant, or with no lubricant at all.

From the practical standpoint, these observations suggest that it is advantageous to insure lubrication at the lip over which drawing takes place, but at the same time to avoid lubrication between the punch and the work. From the standpoint of testing and fundamental research, however, it is probably better to lubricate both sides, and if possible allow adequate clearance between the punch and die so as to insure that all the punch load is transmitted through the cylindrical portion of the cup.

For the purpose of a more systematic comparison of the efficacy of

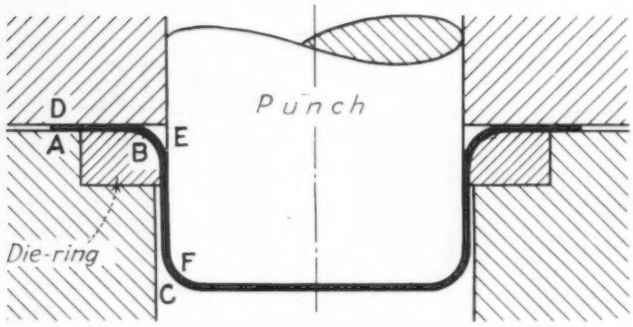


FIG. 3—The essential function of lubrication on the underside of the blank is to reduce the friction over the radius of the die ring B.

various forms of lubrication, tests were made with mild steel, brass, and aluminum blanks. The mild steel and brass blanks were 4.0 in. diameter, and the aluminum blanks 3.5 in. diameter. A common speed of drawing of 1.5 in. per minute was adopted, the radii of punch and die were each 0.25 in., the blank clearance was 2-3 mils., the radial clearance 9 mils., and the lubricant under test was applied to both sides of the blank. In short, the conditions were made comparable in every possible way.

The tests on mild steel blanks were made first, and upwards of fifty lubricants were used. In order to save unnecessary labor, some of the lubricants which proved unsatisfactory with mild steel were omitted from the tests with brass and aluminum blanks, but all which promised interesting or useful results were included.

The range of punch loads varied in the mild steel series from 11,300 lb. to 15,700 lb.; in the brass series from 9300 lb. to 12,100 lb.; and in the aluminum series from 1930 lb. to 3230 lb. Certain of the lubricants caused failure to draw with mild steel and aluminum, but the blank diameter was well within the capacity of the brass strip, and no actual failures were recorded.

The best results and other representative results from the three sets of blanks are shown in Tables II-IV. A comparison of these tables shows that, in a general way, the same lubricants appear high in the order of merit in all three cases, and this fact is reflected in Table V. The principal exception to this rule is naphthalene, which gave good results with mild steel, fair results with brass, and poor results with aluminum. An inspection of the broken aluminum pressings showed the reason for this anomaly: the surface of the aluminum was badly scored. It is clear that the naphthalene, which is essentially a solid lubricant, caused scoring of the softer metal, while it has no such effect on the harder surface of the mild steel and comparatively little on the surface of the brass sheet. Hence, it can only be regarded as a satisfactory lubricant for relatively hard materials.

The proportional effect of lubrication on the punch loads is different with the three metals. With mild steel, the best lubricant reduced the load from about 13,700 lb. to 11,300 lb., a difference of 2400 lb., or 17½ per cent. With aluminum, the change is from 3110 lb. (or more, since the pressing broke at this load) to 1930 lb., a difference of 1180 lb., or 38 per cent. It appears, therefore, that with metals requiring an intrinsically heavier drawing pressure, the absolute

TABLE II

Lubrication of Mild Steel Blanks

Lubricant	Maximum punch load, lb.	Remarks
Graphite in soluble oil	11,300	—
Graphite in tallow	11,400	—
Dry graphite	11,700	—
Beeswax & turpentine	11,900	—
Parax	12,000	½ paraffin, ¼ kerosine, ¼ mineral oil
Sodium soap	12,100	Anhydrous, mixed min. oil
Aquadag	12,200	Graphite in water
White lead	12,300	In linseed oil
Naphthalene	12,500	Dissolved in benzene
Tallow	12,800	—
Lanoline	12,800	—
P.S. compound	12,800	Oil, soap, water, chalk
Iron oxide	13,000	Black; looks like graphite
Sulphur in oil	13,000	Absorbed oil
Steel draw 80 B	13,100	Pigmented. with oil and water
Red lead	13,100	In absorbed oil
Castordag	13,100	Graphite in castor oil
Nil	13,300	Best-non-lubricated result
Cereclor	13,300	Clorinated paraffin wax
French chalk	13,400	In absorbed oil
Soluble oil	13,500	Dissolved in 4 vol. water
Hexachlorethane	13,700	7 per cent solution in soluble oil
Red lead	13,700	Dry
Mineral oil	14,200	Turbine oil
Nil	14,200	Worst non-lubricated result
Oildag	14,300	—
Glycerine	14,500 (B)	—
Flowers of sulphur	14,800 (B)	Dry
Soft soap	15,700 (B)	—

(B) signifies that cup broke during drawing

TABLE III

Lubrication of Brass Sheet (64/36)

Lubricant	Punch load lb.
Graphite in tallow	9,300
Parax	9,300
Anhydrous sodium soap	9,500
White lead in linseed oil	9,600
Beeswax in turpentine	9,600
Tallow	9,700
Graphite in soluble oil	9,800
Lanoline	10,100
Dry graphite	10,100
Castordag	10,200
Grease (H.B.B.)	10,300
Houghtodraw 20 (1: 1)	10.300
Naphthalene	10,300
M.C.D. paste	10,300
P.S. compound	10,300
Metal polish (Brasso)	10,700
Aquadag	10,800
Steel draw 80 B (1: 1 water)	10,850
Oildag	10,850
Steel draw 90	10,850
Hypoy	11,000
Cereclor	11,000
Steel draw 80 B	11,200
Nil	11,300
Mineral oil	11,850

advantage of efficient lubrication is greater, but the proportional advantages less than with more readily plastic metals.

A general inspection of the results, and particularly of Table V, will show that the most effective lubricants are in almost all cases distinguished by a solid constituent. Pure liquids, even fatty oils and liquids commonly used as E.P. lubricants, do not appear suited to deep drawing under the conditions of test.

In this connection it should be mentioned that the process of drawing under examination does not involve any significant degree of ironing, and it is likely that under conditions where severe ironing occurs the results will be different. The difference in effect between good and inferior lubricants may then be more marked, the conditions approximating more nearly those of wire drawing. But for purposes of the present investigation, ironing is not a serious factor.

The behavior of lubricants containing graphite was not altogether consistent. While graphite in tallow gave uniformly good results, graphite in soluble oil fell somewhat from grace with the brass sheet, Aquadag gave inferior results with brass and aluminum, and Oildag gave poor results with all three metals.

These curious disparities led to the suggestion that the fineness and form of the graphite itself might have some bearing on its efficiency as a lubricant, and through the good offices of E. A. Evans, of C. C. Wakefield & Co., Ltd., samples of a number of different graphites were obtained. These were tested in the dry state with mild steel and brass blanks.

It was found that there were considerable variations between the punch loads for the different qualities, and variations which were generally consistent as between mild steel and brass. The best results were given by graphites of crystalline form and by those having a high degree of purity, as measured by carbon content. The fineness of the particles did not appear to exercise much influence, but those samples which contained relatively coarse, gritty impurities sensible to the touch gave poor results.

In making use of the comparisons invited by Table V it is necessary to bear in mind the conditions under which the tests were made. The speed of drawing was considerably lower than that normally adopted in practice, and the temperature of the apparatus was not appreciably higher than that of the laboratory. It has been shown, for example, that the efficacy of grease improves with speed of pressing more than that of graphite, and until tests have been made under speed and temperature conditions more representative of practice, a certain element of caution is recommended in making practical use of the results.

TABLE IV

Lubrication of Aluminum Sheet (Normal-Rolled Soft)

Lubricant	Maximum punch load, lb.
Graphite in soluble oil (paste)	1,930
Parax	1,950
Sodium soap (anhydrous)	1,980
Graphite in tallow	2,030
Beeswax in turpentine	2,040
Tallow	2,230
Lanoline	2,280
White lead	2,290
P.S. compound	2,480
Dry graphite	2,510
Aquadag	2,610
Steel draw 90 (1: 1 water)	2,640
Grease (H.B.B.)	2,690
Steel Draw 80 B	2,750
Castordag	2,860
Vaseline	2,860 (B)
Oildag	2,960
Naphthalene in benzene	3,000 (B)
Cereclor	3,040 (B)
Hypoy	3,100 (B)
Nil	3,110 (B)
Mineral oil	3,190 (B)
Paraffin	3,230 (B)

(B) signifies that cup broke during drawing

TABLE V

Summary Comparison of Lubricants

Lubricant	Mild Steel	Brass	Aluminum
Graphite in tallow	2	1	4
Parax	4	2	2
Graphite in soluble oil	1	7	1
Anhydrous soap	6	3	3
Beeswax in turpentine	5	5	5
Tallow	10	6	6
White lead in linseed oil	8	4	11
Dry graphite	3	9	10
Lanoline	11	8	7
Aquadag	7	17	11
Naphthalene	9	13	poor
P.S. compound	12	15	o

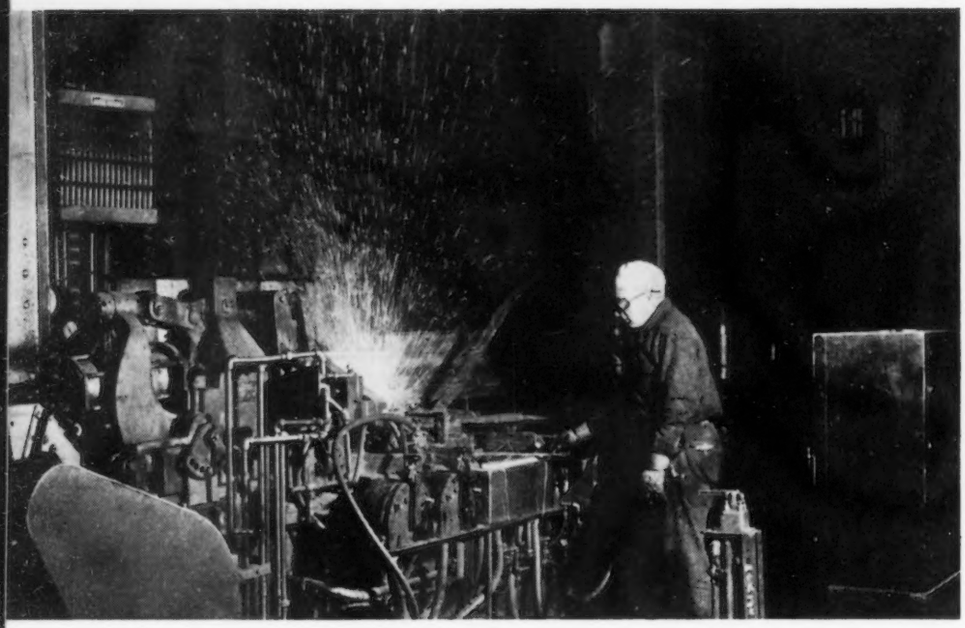
Welding Facilitates Stack Flame-Cutting

ONE of the principal difficulties in oxy-acetylene cutting of steel plates is encountered in clamping the plates together so that the cut can be readily started, especially when small thin sheared plates are stacked. The fins and distortion caused by shearing require heavy pressure of C-clamps or other clamping means to force them close enough together for starting and maintaining the cut.

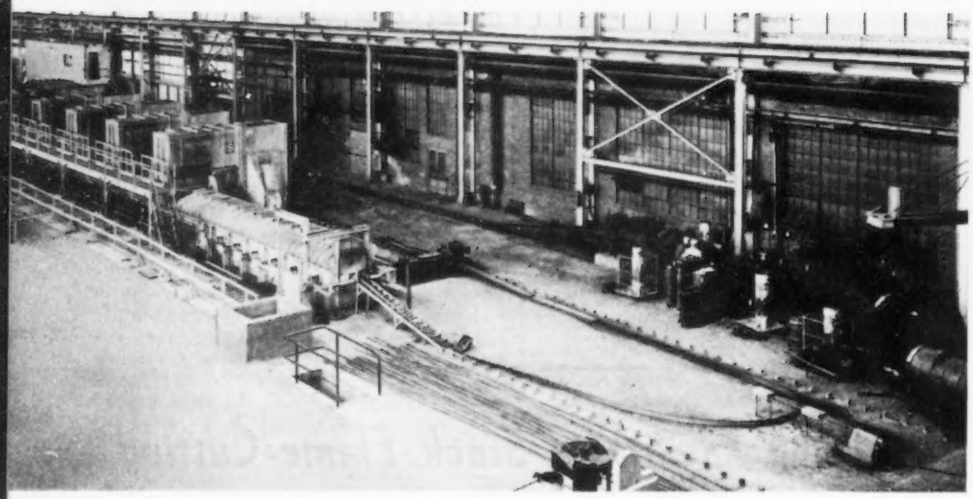
According to S. J. Slater, Air Reduction Sales Co., Boston, a company in his district having orders for large numbers of small circular shapes in 3/16-in. steel solved the problem by utilizing arc welding to hold stacks of 18 square plates together, and furnish starting points for the torch cuts.

The plates which are somewhat curved by the shearing operation were stacked so that half of them had the concave side down and the other half had the concave side up. A C-clamp was used to bring the plates together at one corner, and arc welding beads were run close to the corner on adjacent sides. Due to the curve in the plates, the other corners opened excessively. These were in turn pulled down with the C-clamp and welded in the same manner. The stack was then cut on a No. 6 Oxygraph using one of the welding beads as the starting point for the cut.

. . . Bethlehem Installs New

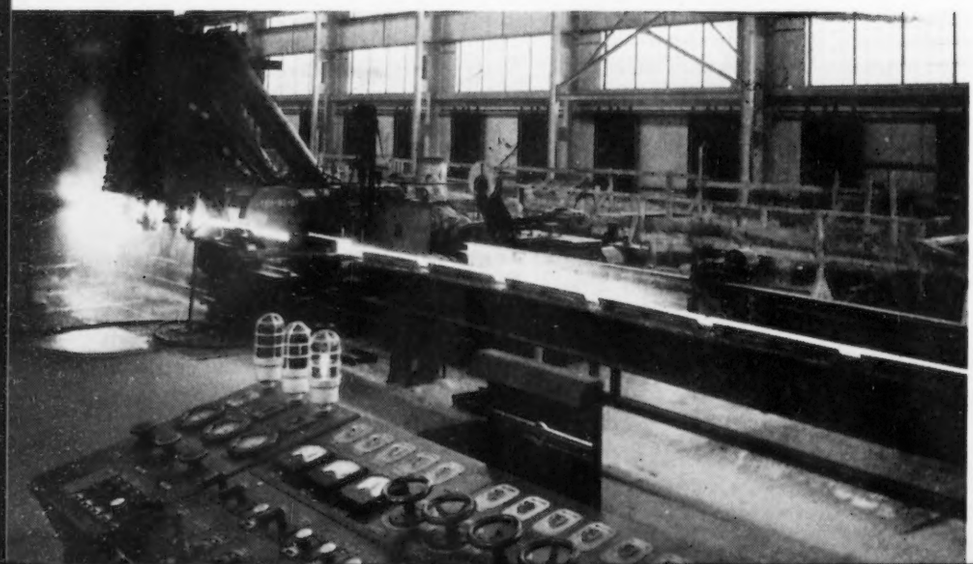


Flash welder in action.



Heating furnace with recuperators and looping bed.

Skelp passing through forming and welding rolls.



A CONTINUOUS mill for the production of butt-welded pipe, incorporating a number of new features, was recently put into operation at the Maryland plant of the Bethlehem Steel Co. Pipe in sizes from ⅜ in. to 3 in. nominal diameter is produced in this mill, which is designed for rolling skelp from 1½ in. to 12 in. wide, in gages ranging from 0.068 in. to 0.312 in. The rated capacity is up to 16 tons per hr. Construction work has also been started on a second unit which will supply butt-welded pipe in a higher range of sizes.

Due to the continuous operation of the mill the skelp is supplied in coils of 35 and 48 in. diameter, instead of in flat lengths. Depending upon the size of the pipe produced these coils weigh from 600 to 2400 lb. each, and contain from 185 to 750 ft. of skelp. The end of the skelp is passed through a roller leveler into an up-cut shear which trims the ends, if necessary. The skelp then goes to an electric flash welder where it is butt-welded to the end of the preceding coil, to form a continuous strip. A plow-type flash trimmer is used for removing the flash from the weld. Depending upon the size of the skelp the welding of a new coil to the preceding coil is completed in from 3½ to 17 sec.

The heating furnace is 147 ft. long and has a heating chamber 21 in. high, 2 ft. 3 in. wide at the top, and 18½ in. wide at the bottom. It is equipped with 274 nozzle-mixing burners spaced at 9-in. centers the full length of the furnace, except for a 30-ft. section at the charging end, which serves as a preheating zone. The burners are arranged in groups of 11, connected to a common header. Each burner has a small gas cock and a blast gate for adjusting the preheated air, thus providing individual burner adjustment. This makes possible very accurate control of the heating operation. Total burner capacity is about 100,000 cu. ft. of 500 B.t.u. mixed gas per hour, delivered at 4 to 8 oz. pressure.

In the preheating zone the skelp is carried on three alloy steel rolls and three water cooled plain steel rolls. These have individual chain and sprocket drives, a 5 hp. motor serving all rolls. This prevents stopping of all rolls in case of chain failure. In

Continuous Pipe Mill

By L. J. HESS
Superintendent Pipe Mills, Maryland Plant, Bethlehem Steel Co.

the heating zone the skelp slides over 12 water cooled skid pipes, which can be removed and replaced without interrupting the operation of the mill. A hole, covered with an 18x9x3 in. tile is provided in the furnace roof sections, directly over each skid pipe.

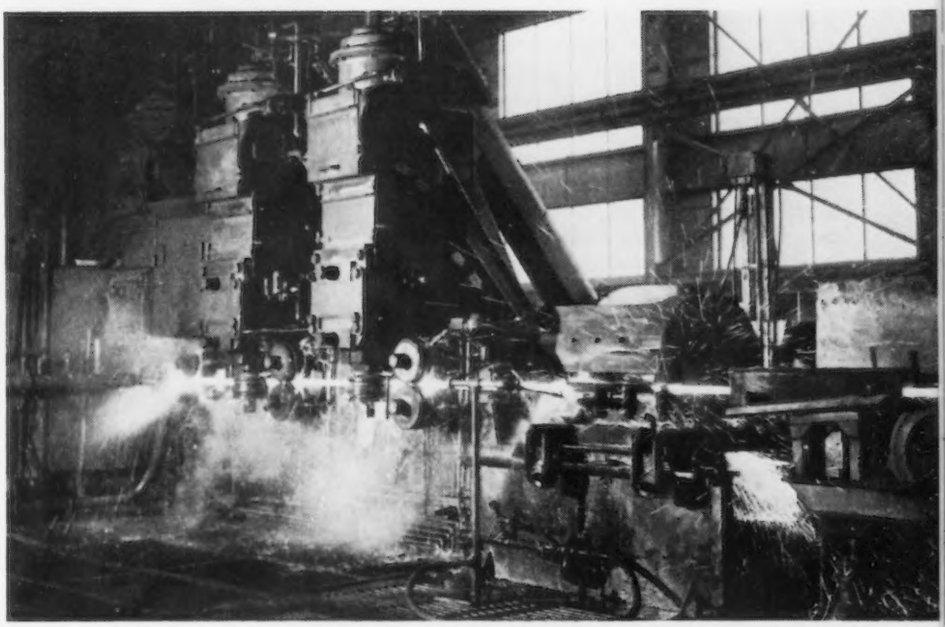
As the skelp passes through the furnace the flames impinge directly upon the edges. These are therefore quickly brought to welding temperature, that is, close to the softening point. The central portion of the strip, however, does not reach this temperature and consequently retains sufficient mechanical strength to withstand the pull exerted by the welding rolls as these draw the skelp through the furnace.

As the heated skelp leaves the furnace it is drawn through a series of six roll passes, consisting of three pairs of horizontal and three pairs of vertical rolls. The first roll pair takes the place of the forming bell of the conventional butt-welding mill while the welding takes place in the remaining five roll pairs. To intensify the heat at the weld and to blow off scale a blast of air is directed against the edges of the skelp as it emerges from the furnace.

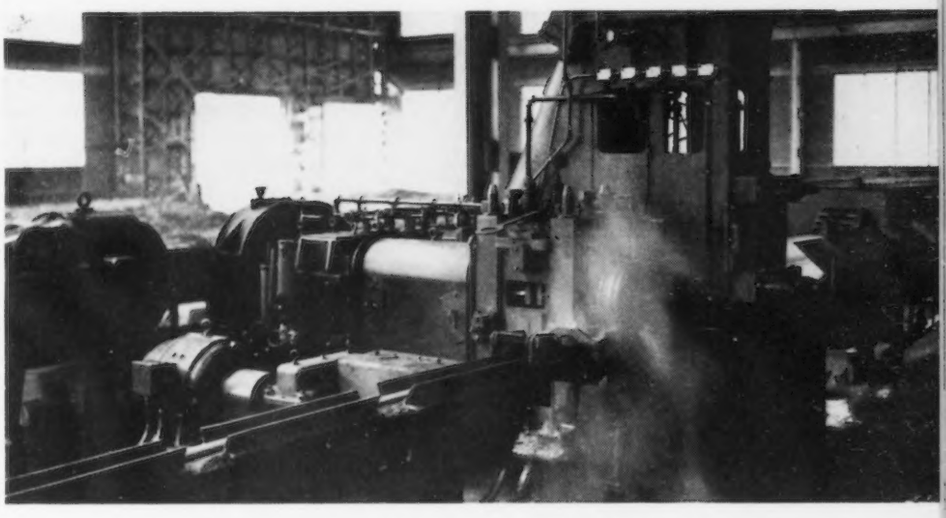
As the pipe leaves the rolls it passes a flying hot saw where it is cut to the exact lengths desired. The saw travel is driven from the welding mill motor and is synchronized with the speed of the pipe.

From the saw the cut lengths pass over a narrow cooling rack, of the chain and sprocket type. It is then carried by a short conveyor to a sizing mill and descaler, where the scale is cracked loose both from the inside and the outside, and where the final size is obtained. This is followed by a second cooling rack of the same type as the first, but 30 ft. long. The pipe is then ready for the regular finishing operations.

The operation of the uncoiler, leveler, trimmer and flash welder is controlled ahead of the furnace, while the mill itself and all other equipment are operated from a pulpit near the discharge end of the furnace. Push buttons are also provided at this point for turning the gas on or off the furnace, also various controls for regulating the amount of air, steam, and water required.

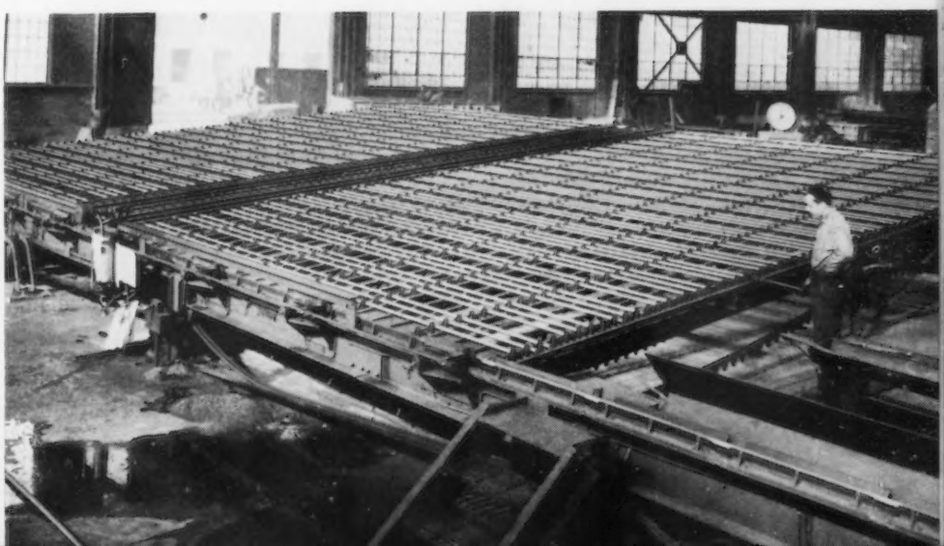


Close-up of welding rolls and hot saw.



Sizing mill and descaler.

Cut lengths of pipe on cooling bed.



DESIGN and FABRICATED

By J. H. COOPER

LAST week the author discussed the factors to be considered in deciding whether a machine should or should not be welded. Data were also given for the design and welding problems involved for structures which must withstand

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STRUCTURES in Group II (see article last week) are what are known to the machine tool trade as bases, frames, beds or columns. Typical examples are broach columns, planer beds, drilling and honing machine bases, rolling machinery frames, draw bench frames, engine bases, etc. Good appearance, rigidity, low weight, and liquid tight coolant paths are the primary requisites of such structures.

It is very seldom that stresses in these fabricated bases are anything but very low, even though the weight may be 30 to 40 per cent less than the weight of a previously used casting. The necessity for good appearance dictates that continuous welding be used on the outside of the structure even though intermittent welding would have adequate strength. In very few instances does the percentage of weight reduction occupy as prominent a place as in this field. Most cast bases contain large areas of thin sections which to a large degree are only space fillers for appearance. These thin sections join heavy sections such as ways, and as such must be thicker to obtain good sound castings. This is not true in the case of a fabricated base. These areas consist of thin rolled steel plate of high quality and high finish.

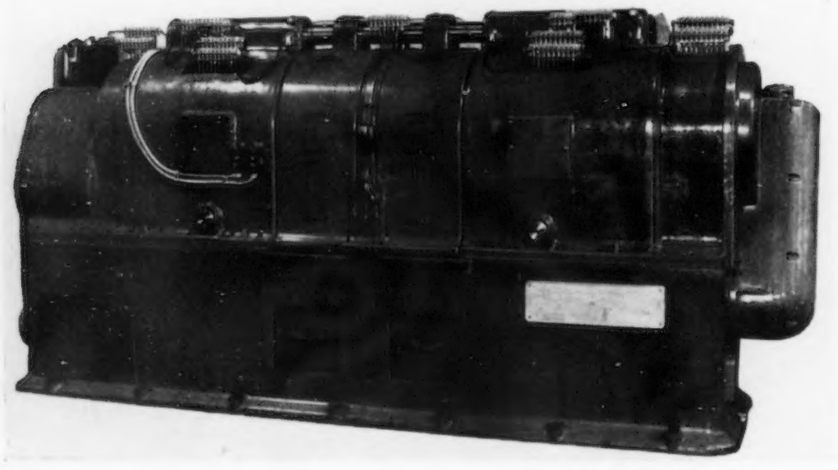
Good appearance is not by any means limited to designs which casting limitations often dictate. If a workman-like job of designing is done with the thought in mind that the metal should be distributed in accordance with specific engineering principles and advantage taken of good fabricating technique, a well balanced symmetrical product will be the result.

The box section and the use of rolled plate bent on a brake to have generously rounded corners are useful tools of the designer for appearance as well as strength.

The use of gas-cut bevels which are filled flush with weld metal and then touched up with a grinding wheel, the use of electrodes which make smooth concave fillets, positioning of work for welding and precision gas cutting are portions of a manufacturing technique which result in excellent appearance.

In a number of cases the footage around the base at floor level is requested to duplicate that of a casting. This duplication can be readily made, as is shown by Fig. 5, in which the rolled plate is bent to shape in a press brake and hold-down lugs and steel corner castings welded in place. However, a footage peculiar to welded design, as shown by Fig. 6, has equal eye appeal and fulfills the utility need.

As examples of good appearance several fabricated bases have been selected at random. Note in Fig. 5 the generous curves, high degree of finish of surfaces and pleasing over-all symmetry. This fabrication was done for the Economy Engineering Co., Willoughby, Ohio, and the tool is a type 3500 fully automatic piston pin drilling, reaming and chamfering machine for drilling piston pins from the solid and finish reaming and chamfering both ends. Fig. 6 indicates how a base with straight lines but with many required openings and bearing pads may still be eye-pleasing. This fabrication is for a continuous cold drawing and straightening machine for producing accurate round and hexagonal bars from hot rolled bar stock in one pass. The machine is manufactured by the Ajax Mfg. Co., Cleveland.



Invariably the use of fabricated steel for machine bases results in a weight reduction. This reduction is particularly pronounced if the base was of cast iron. Since the modulus of elasticity is more than twice that of cast iron, the sections may be materially reduced and at the same time great rigidity retained.

This weight reduction is a benefit in many ways. It results in lower shipping costs, easier handling and less expensive foundations. When large machine tables are fabricated and the weight reduced, savings are gained by being able to operate at greater speeds with the same horsepower or at the same speeds with reduced power costs.

The fabricating designer can use box sections and cross ribbing freely

WELDING of MACHINERY

Welding Engineer, Taylor-Winfield Corp., Warren, Ohio

high total static or dynamic loads. In this concluding part, the author gives the same type of data for structures which are primarily bases, and for miscellaneous small parts gas cut to shape and welded.

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to obtain a high degree of rigidity and freedom from vibration.

Pre-machined ways of special steels may be incorporated into the structure if desired. Other pre-machined parts are often fabricated into the bases in locations which will be eventually innaccessible to machining.

Coolant tanks are fabricated integral with the bases. A common technique is to weld threaded pipe fittings into the tank and base walls which are often too thin for pipe threads.

Fig. 7 is an excellent example of fabricated design which produces a rigid vibration-free structure. This is the frame of a 5-ton, 36-in. stroke variable speed hydraulic surface broaching machine as fabricated for the Lapointe Machine Tool Co. It has a built-in hydraulic reservoir.

All the fabricated machine tool bases must be given a thorough stress relief anneal. This anneal not only removes stresses set up by welding but any stress which may be present in the steel as a result of rolling. This anneal removes the possibility of distortion of the machined base and consequent misalinement of accurately held dimensions.

Fig. 8 illustrates the type of machine tool in which high precision is imperative. This base was fabricated for the W. F. & John Barnes Co., Rockford, Ill., and the machine is used for both boring and honing cylindrical surfaces, particularly in the aircraft industry. No distortion of this base can be permitted. Note the style of base footings. This unit has a built-in coolant tank and drains.

Fig. 9 is an illustration of a line of fabricated actuator bases. These bases are used for governing the flow of water to hydraulic turbines to maintain constant turbine speed. The raised sections on top of the base will be machined to fit the valves which will be mounted vertically. After assembly the fabricated cabinet shown in the upper left hand corner of Fig. 9 is fitted over the valves and completely covers the top of the base. As may be judged by the pipe outlets on top the base and as shown through the openings, this base contains a maze of completely welded piping which works at an operating pressure of 300 lb. per sq. in.

One interesting feature about the fabrication of this base is that a large valve will be installed in the base through each of the two manholes in the top of the base. For maintaining alinement and to permit having a machined surface in a position which will be inaccessible to machining after fabricating, dummy valves are installed during fabrication. The pipes to be welded in the base have machined flanges which are bolted to the dummy valves and then the pipes welded in place. These dummy valves hold accurate dimensions during welding and stress relieving and are removed only when the base is ready to receive the operating valves. These bases are fabricated for the Woodward Governor Co., Rockford, Ill., and weigh approximately 18,000 lb.

Group III

This group of machine tool parts (miscellaneous small parts gas cut to shape and welded) undoubtedly makes up the biggest percentage by *number* if not tonnage of all fabricated steel. The field is highly competitive, not

AT LEFT

FIG. 5 — The footage around the base of this welded structure is the duplicate of a cast structure.

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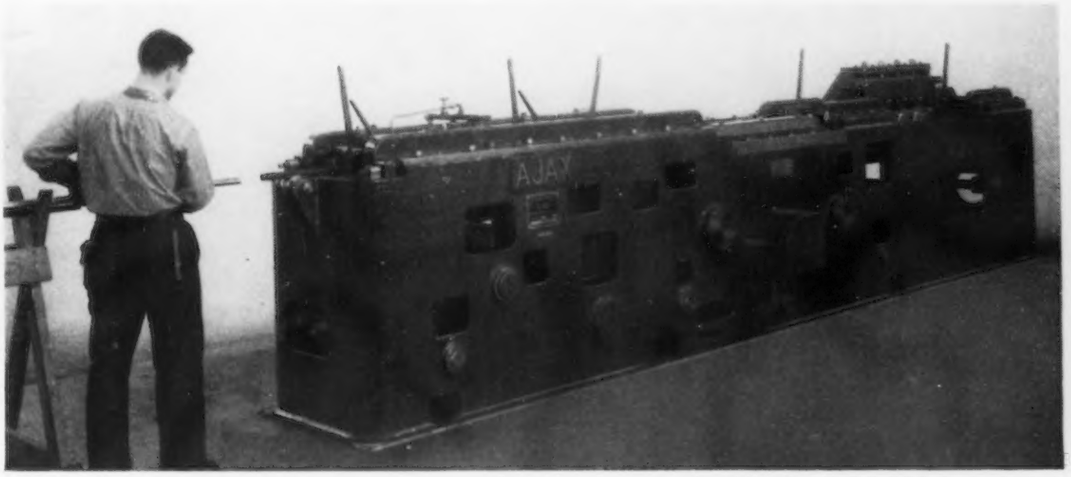
AT RIGHT

FIG. 6. — The footage around this machine is peculiar to welded design.



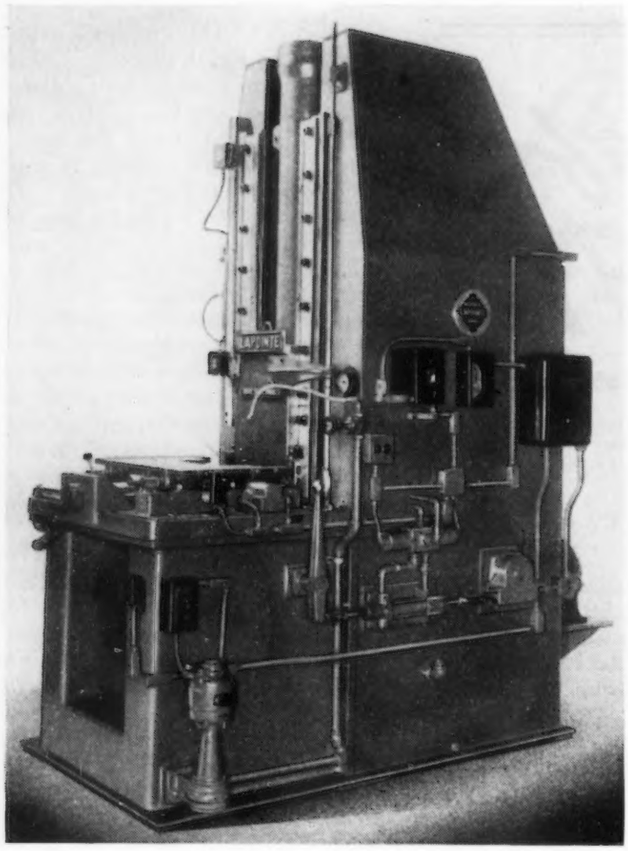


FIG. 7 — This welded structure is of such a design as to be rigid and free from vibration.

only because such parts can be made by almost any and all fabricating shops but also because many of the advantages of fabricated steel over castings are lost. In spite of stiff competition, however, ingenious design and manufacturing short cuts account for a high yearly tonnage.

Such parts as hoods, guards, brackets, brake arms, repair parts, gas cut gear blanks, cam blanks, etc., are but a few examples of the production of this type of apparatus. Fig. 10 shows a few of such typical parts.

MANUFACTURING TECHNIQUE: Having segregated the various types of machine tool fabrications into the three major groupings and considering the individual requirements of each group, it should be of interest to proceed to manufacturing features which apply to all groups.

MATERIAL: Rolled sheet and plate purchased is carefully watched to see that only clean, uniform, silicon-killed steel which is free from excessive scale or laminations is obtained. For best results, such steel does not contain over 0.20 per cent carbon, and phosphorus and sulphur are kept low. Castings are also watched for unsoundness and as low a carbon content as can be consistently obtained.

Such steel castings are used for two purposes. Whenever a section is heavy and rather complicated, particularly when too thick to gas cut or has an excessively high ratio of weld metal to total weight, then a casting is used. A bearing block greater than about 8 in. in length typifies such an application. It is difficult to obtain high quality cuts in steel much over 8 in. in thickness. The other purpose for which castings are used is that of thin sections containing compound curves which are difficult to fabricate economically. Such castings are mainly used for appearance rather than strength. Fig. 11 is illustrative of such standard castings used for coolant trough corner sections, footing corner sections and hold-down pads, etc. The radii of such castings are of such dimensions that the castings blend well with the steel plate bent to shape.

Electrodes, consist of only the high quality heavily coated variety with the exception of a very small percentage of electrodes with medium weight coatings which are used for tack-welding at assembly.

It is somewhat axiomatic that more than one quality of welding cannot be done by the same personnel without a drop in the quality of the highest quality weld. This is the reason for the use of only high quality heavily coated electrodes. Close control of the amount of deposited metal assures maximum economy consistent with the required quality.

All such deposited weld metal has consistent physical test values in line

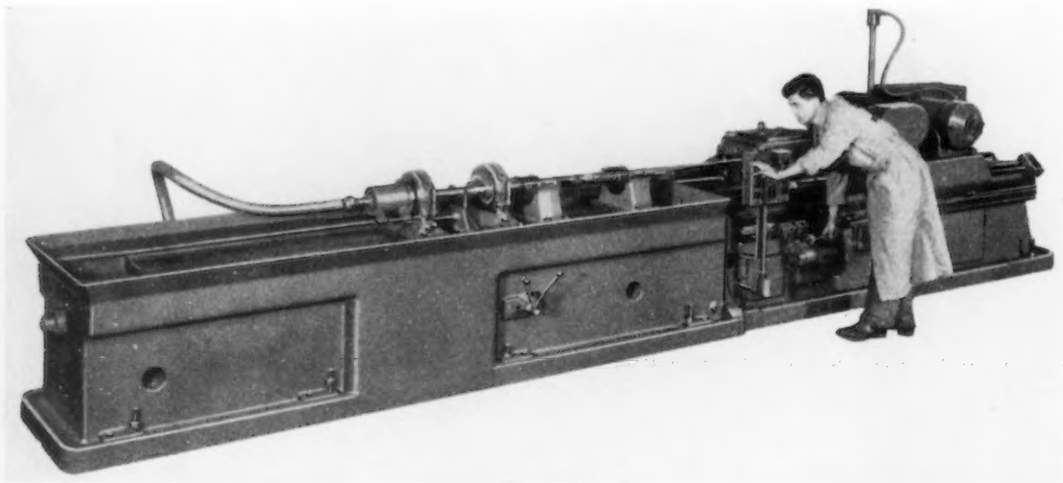


FIG. 8 — In this type of welded machine high precision is imperative.

FIG. 9—Top view of welded actuator base. The base contains a maze of completely welded piping.

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with the values advised by several reputable electrode manufacturers.

Equipment

GAS CUTTING: All gas cutting is done by the use of oxygen and acetylene. The large size traveling beam type of automatic gas cutting equipment is used. Such equipment can cover steel plate of a maximum dimension of 72 in. by 100 in.

These machines carry two torches with fully remote control for multiple cutting from templets and will run without guiding or templets to cut circles and straight cuts. When contour cutting is required on a few pieces, full size tracings are used as templets with the operator tracing the lines. When high production is necessary, permanent templets are made using plywood and aluminum strip for automatic tracking, thus eliminating guiding by the operator.

Edges of plates are chamfered or beveled by use of small portable tractor type of carrier for the gas torch.

MECHANICAL CUTTING AND FORMING EQUIPMENT: The usual line of power saws, power punches, iron workers for copying and cutting bar and angle stock, circle shears, drills, etc., are necessary to the economical fabrication of steel. Rolls for forming cylinders, power shear for high speed cutting of sheet up to ¾ in. thick by 72 in. wide, press type of brake with full complement of angle and radius die sets are essential.

ASSEMBLY EQUIPMENT: A large, accurately machined and properly installed layout table is absolutely essential for this type of work. Such a table must have T-slots or multiple holes for clamping parts in place during assembly. Individual jib cranes and hoists make an economical setup. Arc welding sets, gas cutting equipment, squares, levels, etc., are of course needed.

During and after assembly a careful process of welding reinforcing members in place is carried out. Such members help to prevent distortion during welding and annealing and

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FIG. 10—Miscellaneous small parts gas cut, or gas cut to shape and welded. This type of work is competitive with castings.

FIG. 11—Types of castings used with welded structures.

must be so placed as not to interfere with welding. They are not removed until after stress-relieving.

WELDING EQUIPMENT: Portable gas cutting and welding sets are of course available.

Direct current welding machines are used exclusively for tack welding at assembly. Alternating current welding machines and transformers are used entirely for final welding. Minimizing of magnetic arc blow and high quality of weld appearance and deposited metal obtained by the use of a.c. and heavily coated electrodes make this an unbeatable combination. Single operator sets are used because of the high degree of operating flexibility.

Welding manipulators are only used for production work. The usual run of machine tool bases in lots of one can more economically be handled by individual jib cranes and air hoists for each welding operator.

STRESS-RELIEVING: After welding, the fabrications are put through a closely controlled heating cycle for a stress-relief anneal. For a proper anneal, the temperature of the furnace should not exceed 150 deg. F. plus the ambient temperature at the time the structure is placed into it. The structure is then heated to 1175 ± 25 deg. F. After reaching this temperature, the structure is held at that temperature for at least 1 hr. plus 1 hr. per in. of thickness or faction thereof of the heaviest section. It is then allowed to slowly cool at a rate not to exceed 150 deg. F. per hr. until it reaches a temperature not in excess of 150 deg. F. plus the ambient temperature. At this time it may be removed from the furnace and allowed to cool to room temperature in still air.

CLEANING: After annealing the structure is shot or sand blasted to remove the welding slag, surface scale and iron oxide and part of the weld spatter.

The generous use of a cleaning bar and air or motor driven brushes and grinding wheels completes the cleaning. Touching up of rough spots on gas cut edges or surfaces of butt welds pays dividends in quality of finished appearance.

What's New in Welding Apparatus

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By FRANK J. OLIVER
Associate Editor, The Iron Age

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STARTING out with recent developments in electric resistance welders, this review covers a number of new accessories for them, transformer type arc welders, new controls for motor-generator type arc welders, electrodes, and gas welding and cutting equipment. An oxygen flow regulator has been designed for precisely controlling large quantities of oxygen from batteries of tanks.

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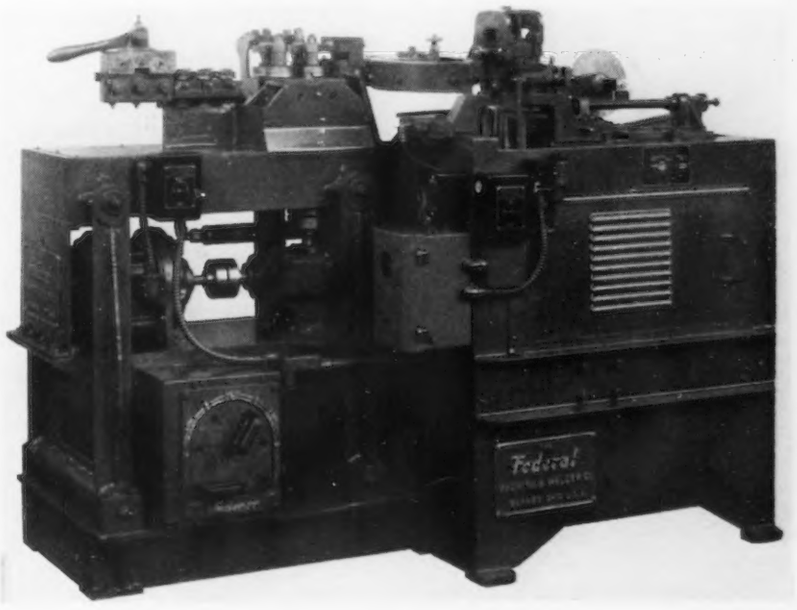
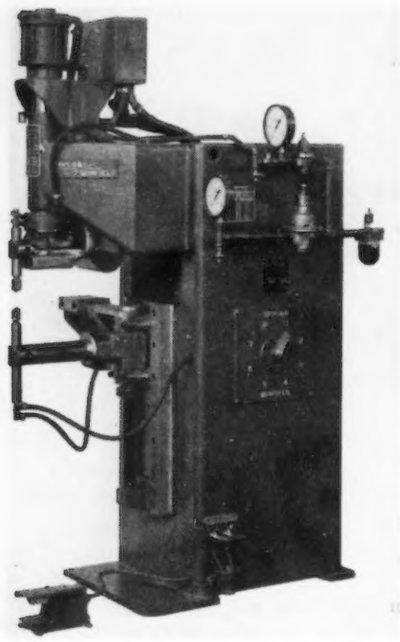
IN the past, the welding of wire hoops for nail kegs and other shipping containers has entailed three separate operations, including straightening of the wire and cutting to length, forming into a circle and welding. The *Federal Machine & Welder Co.*, Warren, Ohio, has recently developed a completely automatic machine which takes wire from a reel at a speed of 150 to 175 ft. per min., draws it through a set of two-plane straightening rolls, then passes it through three adjustable forming rolls where it is formed into a hoop of the required diameter. After the wire is formed, it is sheared to exact circumferential length, welded to form the hoop, which is ejected on a stacking fixture. When a predetermined number of hoops are stacked, the fixture is tripped by a limit switch and a new stack starts to pile up. All the operator has to do is load the coil of wire in the reel, start it through the straightener, and remove the completed hoops in stocks.

The particular machine shown was arranged to weld rings of 10 or 11 gage wire, 14 to 15½ in. in diameter. The hoops are flat within 1/16 in. and have a tolerance of 0.005 in. on the diameter. Production is 1500 to 1800 hoops per hr. The method may be adapted, however, to any size of wire and any diameter of ring.



Spot and Projection Welder

A COMBINATION knee and horn has been designed by the *Taylor-Winfield Corp.*, Warren, Ohio, that in one position permits regular spot welding through conventional points and holders and in the other presents a knee on which projection welding dies



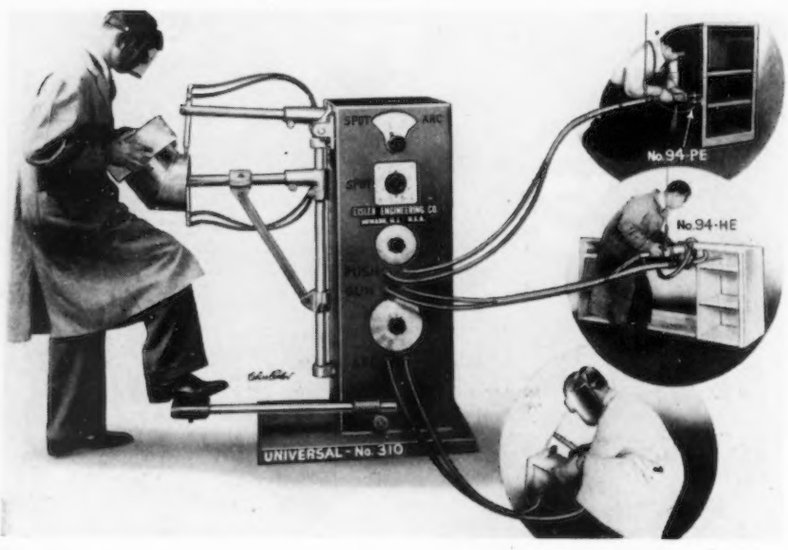
may be mounted. The swinging bracket is clamped on a vertical faceplate and is readily adjustable approximately 12 in. by a screw arrangement to suit various die sets. The illustration shows the device applied to a type EN welder with air operated ram, but it is available on motor or hydraulic operated machines as well, in all standard capacities and throat depths.

Power Factor Correctors

A STEADY trend to increasing size of welding machines has introduced the problem of power supply to welders. For the purpose of reducing the kva. demand of such machines and minimizing line disturbances, *General Electric* has developed a new series-capacitor system consisting of a capacitor connected in series with the transformer primary of the resistance welding machine and of such rating as to improve the power factor of the welding circuit to approximately unity, thereby reducing the kva. demand 50 to 70 per cent. This equipment can be applied to spot, projection, seam, and butt resistance welding, and is used with both synchronous and nonsynchronous control. It may be applied to existing welding machines as well as to new applications. The series-capacitor is made up of individual Pyranol condenser units mounted in a supporting rack. Such racks are available for floor, wall, or ceiling mounting.

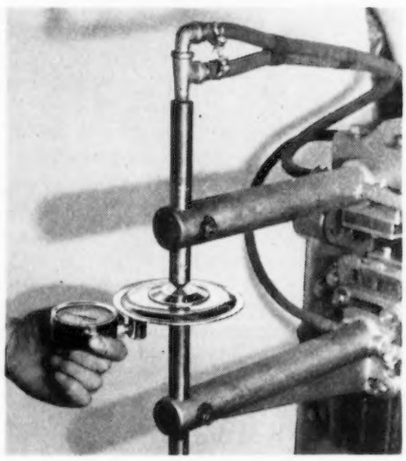
Universal Spot Welder

NOT only spot welding, but also push welding, gun welding and even arc welding can be performed on the No. 310 universal spot welding machine, recently developed by the *Eisler Engineering Co.*, 740 South 13th Street, Newark, N. J. The spot welder proper is a standard foot operated machine similar to the company's 10-kva. spot welder, with sliding horns especially adapted to all kinds of sheet metal work, although it can be furnished up to 50-kva. capacity. The push spot welder is hand operated, while the gun welder is air operated. The spot welding machine can also be arranged for air operation. The arc welder is of the a.c. transformer type and can be supplied in 200, 300 and 400 amp. capacity. The machine is supplied with individual controls so that each operation can be performed without interfering with the setting of the other. The equipment is made for 25, 40, 50 and 60 cycles, 220, 440 or any other voltage.



Spot Welding Pressure Meter

ACCURATELY regulated pressure is essential for good resistance welds as are the amount of current passes and correct timing. To provide



a practical and reliable means of checking the pressure being applied to the tips in spot welding machines, the *Thomson-Gibb Electric Welding Co.*, Lynn, Mass., has developed the pressure meter shown. It consists of an oil filled diaphragm connected to a dial gage calibrated to read directly in pounds. The diaphragm has been held to an overall thickness of 1 in., so that it can be used on practically all machines. The meters are made in ranges from 0 to 600 lb., up to 0 to 8000 lb. Obviously, the line switch must be opened before placing the meter between the electrodes. The meter can be used on all spot and press type welders, both foot and power operated.

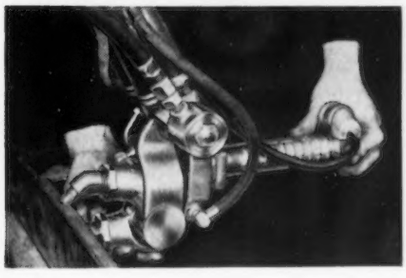
Welding Current Meter

A CONVENIENT means of measuring welding current from 50 to 50,000 amp. and of voltages of such short duration as 1 cycle of a 60-cycle wave, is found in a new glow tube

meter recently introduced by *Weltronic Corp.*, 2832 E. Grand Boulevard, Detroit. Calibrated by an oscillograph for current and by a high vacuum tube voltmeter for voltage, it can be used with circuits of other than 60 cycle by using a corrective factor. The assembly consists of a special air core transformer for use in current measurements, a small potential transformer for use in voltage measurements, an accurately calibrated rheostat and a neon glow lamp. In taking readings of current, the hinged window is closed over an electrode arm or table, with the selector switch set according to directions, and the large dial is manipulated until the glow lamp will just flash every time a weld is made. A chart indicates the value of current for each dial setting.

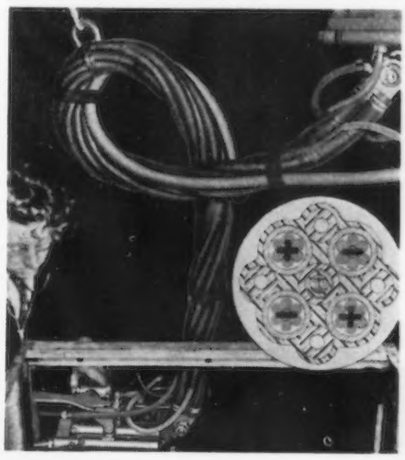
Hydraulic Cable Clamp

A NEW hydraulic welding-cable clamp which increases gun handling speed, reduces operator fatigue and through its positive clamping action provides full current transfer and therefore more uniform welds has been announced by *Progressive Welder Co.*, 3017 E. Outer Drive, Detroit. The new clamp is so designed that the cable and gun are locked hydraulically while pressure is on for a weld, while the moment pressure is released the clamp unlocks, permitting the gun to be swiveled to a different position, with little or no movement of the cable. The device consists of a small pressure chamber the plunger of which actuates a hollow bolt. This bolt is inserted through both cable and gun terminals (with the necessary insulation) and the lock nuts on the bolts are tightened and locked. The new cable clamp is made in five different sizes to accommodate various types of sliding contact or pincer type Progressive guns.



Kickless Welding Cable

ANOTHER recent development of the *Progressive Welder Co.* is the No-Kik welding cable, having four conductors instead of the usual two. The method of arranging the duplicate positive and negative cables neutralizes each other's magnetic field, resulting in less internal wear through cable kicking and a 60 per cent reduction in welding cable costs, it is claimed. At gun and transformer ends, each pair of positive and negative cables are joined to a single, solid attachment. A seamless rubber covering maintains cables in their relative position between the gun cooling lines and the control cable which forms the core of the unit. Cooling water is circulated through the cables themselves. The cable is supplied in 250,000, 400,000 and 750,000 circular mils capacities and in 6, 8 and 10 ft. lengths. It may be supplied with special adapters for any gun welder-transformer combination.

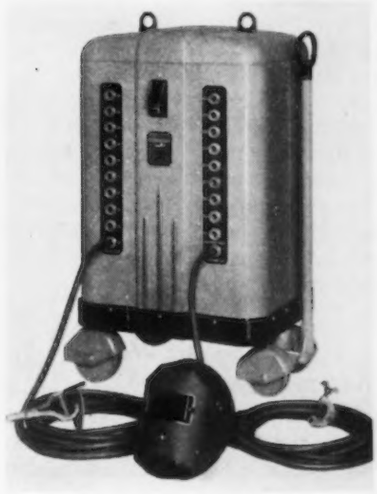


Transformer Type Arc Welder

A UNIQUE four coil transformer design with reactance control is used in the new a.c. Arcmaster welder recently announced by the *Bear Mfg. Co.*, Rock Island, Ill. This multiple coil construction is said not only to smooth out the power variation and provide a smooth flow of current, but also makes possible a constant welding voltage, with calibrated amperage from lowest to highest output. Operating safety is assured since there is no connection between the input and the output. A circuit on the output cannot be completed until actual welding takes place. The entire welder case is made of heavy cast aluminum for rapid heat dissipation. The unit is furnished in three models with ranges of 10-200 amp.; 10-250 amp. and 10-300 amp. Each unit is furnished with ground and electrode cables, head shield, rod holder and an assortment of rods.

A.C. Arc Welder

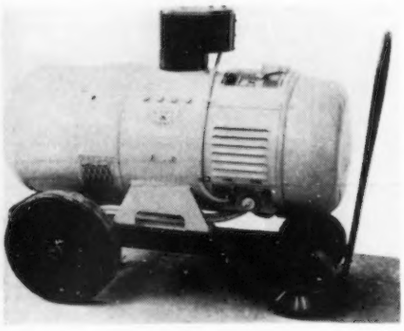
TWO new truck models, equipped with roller bearing wheels for ease in mobility, have been added to the line of a.c. transformer type arc welders made by the *Marquette Mfg. Co.*,



Inc., Minneapolis. The 400 BT model shown has a range from 30 to 350 amp., with a separate plug tap for each of the 19 heat stages. The transformer is said to operate at full capacity continuously and to deliver a strong, stable arc at any heat stage. The new 300 BT model is rated from 20 to 250 amp. and is similar to the 300 B model except for the mobility features. The handle and pivot of the lead truck have oilite bearings while all four wheels have roller bearings. All models come equipped with helmet, electrode holder and necessary cables.

Remote Control for Arc Welder

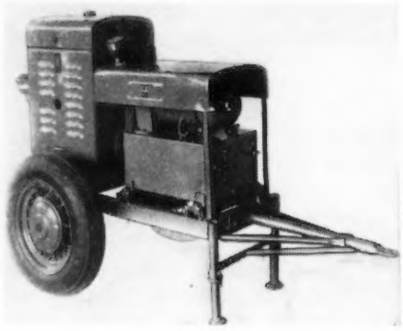
A NEW device for remote control of Wilson "Hornet" arc welders has been announced by *Wilson Welder & Metals Co., Inc.*, New York. In place of the handwheel which ordinarily governs the control pole of the welder there is put a small reversing motor (rated at 1/80 hp.) and remote control device actuated at the electrode holder. When the electrode button marked "more" is brought in contact



with the ground, the auxiliary control motor raises the control pole core, increasing the output. When the button marked "less" is grounded, the motor is reversed, decreasing the output. The contact buttons are shaped differently so that the operator has no difficulty in locating them even in poor light. The generator may also be preset by push buttons on the control itself. The unit is designated as the type SC remote control device.

Portable Arc Welders

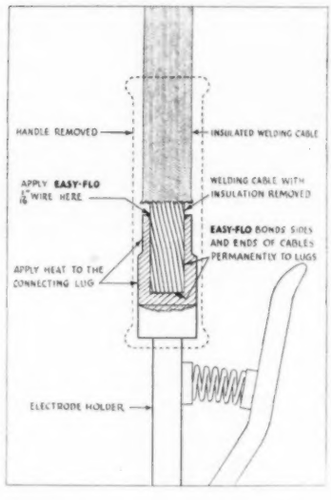
SELF-EXCITATION, self-stabilization and simple control are features claimed for a new line of heavy duty portable arc welders recently introduced by the *Comet Products Co.*, Chappaqua, N. Y. The welder is offered in four sizes: 150 and 200 amp., powered by a Wisconsin four cylinder



air cooled engine; 300 amp., powered by a Continental six cylinder water cooled engine, or all three ampere ranges equipped with the Waukesha Hesselman diesel. The machines are designed to be used for mass production welding on a 24-hr. basis, and the welder's heavy duty construction permits, it is said, the use of relatively large size electrodes at high amperages without danger of burning out the machine. A simple control of both voltage and current permits a wide selection of operating conditions. Excitation is from the main commutator, which is heavily constructed,

Hard Soldered Cable Connection

HARD silver solders are now being used for connecting arc welding cables to the electrode holder handle in order to overcome the melting of soft soldered connections under heavy duty operation. In using such a hard solder or low temperature braz-


HANDLE REMOVED
INSULATED WELDING CABLE
APPLY EASY-FLO WIRE HERE
WELDING CABLE WITH INSULATION REMOVED
EASY-FLO BONDS SIDES AND ENDS OF CABLES PERMANENTLY TO LUGS
APPLY HEAT TO THE CONNECTING LUG
ELECTRODE HOLDER

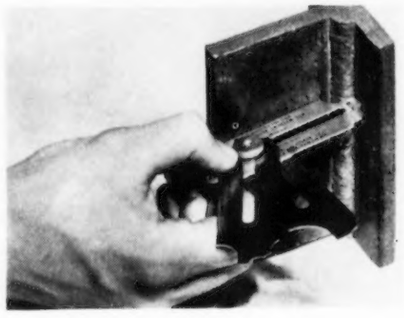
ing alloy, such as Easy-Flo (melting point 1175 deg. F.), the parts are first fluxed, then assembled and heated with an oxy-acetylene torch to a dull red heat before feeding the silver solder to the joint as shown in the sketch. About 4 or 5 in. of 1/16 in. wire is required to flow in and around the cable. Cost of brazing alloy and gases for a joint of this kind do not exceed 5c., it is said.

Welder Start-Stop Device

ANOTHER recent development of the *Wilson Welder & Metals Co.* is an automatic start and stop device for arc welding generators driven by an a.c. motor. With this device, the operator starts the welding unit simply by touching the work with his electrode holder. When welding is interrupted, the machine automatically stops after a time delay which may be set between ½ and 1½ min. Thus power waste from long idling between jobs is avoided. The standard device is reconnectable for 220 to 440 volts and is used in conjunction with any magnetic starter.

Weld Fillet Gage

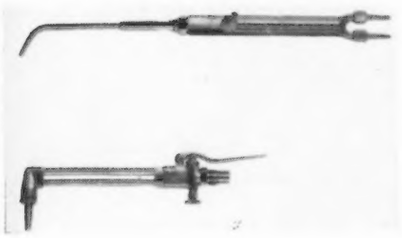
A NEW low-priced weld fillet gage has been developed by *General Electric* to provide welding inspectors and operators with a fast, accurate



means of checking the size of arc fillet welds. The new device consists of three stainless steel stampings held together by a bolt and a knurled thumb nut. Either convex-concave or standard convex fillets can be checked merely by fitting the edge of the gage flush against the work so that the indicating portion of the gage rests on the weld bead. The gage can be used on fillets of the following sizes: 5/16, ⅜, ¼, 5/16, 7/16, ½ and ⅝ in.

Welding Blowpipe

A NEW medium-pressure oxy-acetylene blowpipe (upper) for welding light gage metal and a cutting attachment (lower) for cutting iron and steel up to 1 in. in thickness, have



been announced by the *Linde Air Products Co.*, a unit of *Union Carbide & Carbon Corp.* The blowpipe, known as the Prest-O-Weld Type W-109, is specially designed for welding in light production work and in aircraft construction. Its field of usefulness includes, however, all applications to metals up to ⅜ in. thickness. The cutting attachment, designated as type CW-109, is attached directly to the blowpipe handle in place of the welding head. The attachment has an improved cutting valve with rubber seated stem, and a cutting valve lever that can be turned back 90 deg. to permit access to the cutting valve assembly. Two cutting nozzles are supplied, Nos. 0 and 1. There are eight sizes of welding heads for the blowpipe, each with an individual mixer, making the heads less sensitive to pressure fluctuation. Size A screw type hose connections are used.

Carbon Arc Torch

FOR preheating, general heating of metals, welding of aluminum, white metal, copper and other nonferrous metals, brazing and soldering, and in general doing most of the jobs heretofore assigned to gas welding equipment, a carbon arc torch has been developed by the *Marquette Mfg. Co., Inc.*, Minneapolis. By striking the arc across two carbons, there is said to be

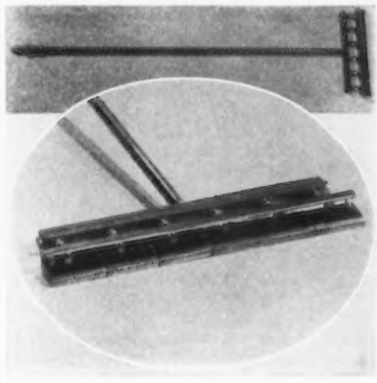
none of the blow or force found with single carbon arc process or with gas equipment. Hard solders such as Easy-Flo and Sil-Fos and other silver solders can be handled with extreme ease, it is said. The heat of the flame can be readily controlled by change of ampere stages on an a.c. transformer type arc welder or a motor-generator set. Much less current is used than when welding with the metallic arc. The torch comes with two 10-ft. cables, four ⅜-in. carbons and four ¼-in. carbons and adapters for them.

Weld Grinding Wheel

A NEW type wheel especially designed for weld grinding and snagging, designated as Atlantic type AK, has been introduced by the newly formed *Atlantic Abrasive Corp.*, 512 Pearl Street, South Braintree, Mass. The wheel makes use of a patented synthetic bonding material to permit maximum working speed and pressure without danger of burning. Use of this wheel will insure both the lowest possible labor cost and a better finished product, according to the manufacturer.

Special Torch Nozzles

SEVERAL new types of nozzles for torch flame application have recently been designed and built by the *Victor Equipment Co.* of San Francisco. The unit illustrated is one of a number of flame dehydrating and



descaling nozzles for application to structural steel before painting the surfaces. The nozzle shown is comprised of removable sections, permitting the width of the ribbon of flame to be adjusted to meet specific requirements. In another torch, not shown, especially designed for flame hardening the surfaces of rock plant screening plates, a wide roller has been incorporated behind the flame hardening nozzle to facilitate the torch operation and prevent tilting of the nozzle as it passes over the series of holes in the plate. Torches have also been made for flame softening for such applications as taking out buckles in plates. A large circular multi-flame heating nozzle is used, with a water cooled tip. Such a tip can also be supplied with an integral quenching head.

Preheating and Stress Relieving System

BY special wave form generating and a super-imposed high frequency current, the Smith-Dolan induction and hysteresis method for preheating and normalizing, so widely used in high pressure pipe welding, has been extended to high carbon, molybdenum, chromium, vanadium and other alloy work in any shape or size. This improvement also allows of lagged piping up to 4 in. thickness of covering to be stress relieved without removing the covering. Welding of odd shapes such as chrome-moly propellers are evenly preheated and stress relieved (after welding) by this process, developed by the *Electric Arc Cutting & Welding Co.*, 152 Jelliff Avenue, Newark, N. J. This high frequency special wave form development has the attribute of substituting current for pyrometer control, that is, under given conditions of current and turns a definite temperature will be reached and there is no over-running.

The company has also brought out a portable preheater for flat work, consisting of half of a laminated transformer core which is laid up against the work. The work, not being laminated, gets hot very quickly, according to the amount of energy put through the half transformer core.

Oxygen Flow Controller

BELIEVED to be the world's largest oxygen flow controller, the Airco Flomaster, announced by the *Air Reduction Sales Co.*, New York,

has a discharge capacity up to 60,000 cu. ft. of oxygen per hr. and will deliver a pressure from 0 to 200 lb. per sq. in., from cylinder pressures as high as 2500 lb. per sq. in. The instru-

ment is designed to make precise pressure regulation practically independent of variations in demand rate and of variations in inlet pressure as the storage bank is drained down to its terminal pressure. The control panel has two pressure gages and a flow indicator for estimating the probable drainage time, together with the necessary controls. The flow indicator is adaptable for four overlapping flow ranges.

The delivery pressure of the controller is governed by a pilot regulator with adjusting handwheel. This pilot regulator discharges gas directly into the control dome which is bolted over the diaphragm of the main regulator and the dome capacity is augmented by a cylinder reservoir seen at the left in the illustration. Together with a diffuser block, which leaks a small amount of gas, this arrangement makes the delivery pressure of the controller substantially independent of variations in diaphragm position. A hydraulic dashpot serves to stabilize the motion of the operating mechanism which is a weighbeam type. The main regulator body is fitted with a relief valve and also a 3-in. bursting disk. A large area glass wool filter is provided. This sensitive control device may be used to control other gases than oxygen, such as compressed air, nitrogen and hydrogen, by making minor variations in the flow indicator.

Chill Ring for Pipe Welding

FOR use in high pressure power plant work and for any operation in the general industrial field involving the welding of pipe, *Wedge Protectors, Inc.*, 9549 Richmond Avenue, Cleveland, announce a new wedge backing or chill ring. The spacing head in the center of the chill ring assures a joint of uniform width, thus standardizing the amount of welding electrodes to be used on each joint. Also, with the chill ring, the welding operator can penetrate to the inside of the pipe with the first layer of weld metal.

Hard Facing Electrodes

TWO new electrodes of cast abrasive resisting alloys, to be known as Faceweld No, 1 and Faceweld No. 12, to be used for hard-facing by the metallic arc process, have been announced by the *Lincoln Electric Co.*, Cleveland. These coated electrodes produce a smooth dense deposit, said to be very resistant to abrasion but not excessively hard or brittle. Faceweld No. 1 is the softer and tougher of the two, having a single layer hardness of 45 to 52 Rockwell C scale, as against 52 to 57 C for the No. 12 electrode as deposited. Multiple layer deposits are somewhat harder. Faceweld No. 1 is used for surfacing such parts as digger teeth, cement plant machinery, etc. Faceweld No. 12 has somewhat lower impact strength, being harder and more resistant to abrasion, and is to be applied to screw conveyors, dragline bucket parts, dredge pump impellers and casings, crusher roll plates, etc. Both electrodes are furnished in the ¼-in. size, 12 in long, and take an average current of 200 amp. (300 amp. max.).

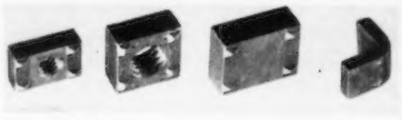
Portable Acetylene Generators

POSITIVE regulation of outlet pressures, cooler and cleaner gas and elimination of the "hot belt" are features claimed for a new line of two-stage portable acetylene generators announced by *Smith Welding Equipment*

Corp., Minneapolis. All water in the generator chamber is circulated by a non-mechanical air lift device which simultaneously cools and scrubs the acetylene gas. This automatic circulation of the water within the generator results in the elimination of the usual hot belt at the water line. Carbide is fed into the water as needed by a large pressure regulating diaphragm type feeding mechanism. Generated acetylene passes through the water circulating device through the hydraulic back pressure valve and filter tank. Here it passes through another diaphragm type pressure regulator which controls the outlet flow of gas. Simplicity of operation is featured in these type J generators which are available in 15, 30 and 50-lb. sizes.

Welding Nuts and Bosses

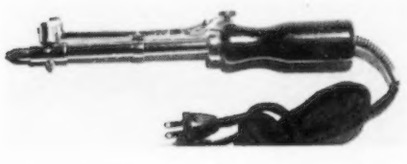
RECTANGULAR welding nuts, rectangular welding bosses and welding brackets to take advantage of the economies in improved designs that are available through use of electric resistance welding machines have been brought out by *Ohio Nut & Bolt Co.*, Berea, Ohio. The rectangular welding bosses are available for production in sizes ranging from ⅜ in. wide by 1 in.



thick by ½ in. long, up to 13/16 in. wide by ⅜ in. thick by 1 in. long. The rectangular welding nuts are available in a similar range of outside dimensions and with threaded holes for assembling with screw threads ranging from ⅛ in. to ⅝ in. in diameter. The welding brackets may have welding projections on one or both legs which can be made up to 1½ in. long. The widths of the brackets range from ⅜ to 13/16 in. Welding brackets are furnished with tapped holes in one or both of the legs or with drilled or reamed holes.

Fountain Feed Soldering Iron

INCORPORATION of a fountain feed solder head in an electric soldering iron permits the operator to have one hand free to hold parts or adjust the work. In the new Ducon Solder Master, made by the *Dual Remote Control Co., Inc.*, 31776 West Warren, Wayne, Mich., solder is delivered a drop at a time by depressing



a button on the handle near the operator's grip. The drop issues from a small tip under the reservoir pot on the tool head. Spillproof cup holds 48 average drops of solder. The assembly includes a ½-in. screw tip, 60-watt heating element and rubberized handle. Operation is on 115 volts, a.c. or d.c. Net weight including cord is 11 oz. Distribution will be handled by *Ducon Sales Co.*, 2816 David Stott Building, Detroit.

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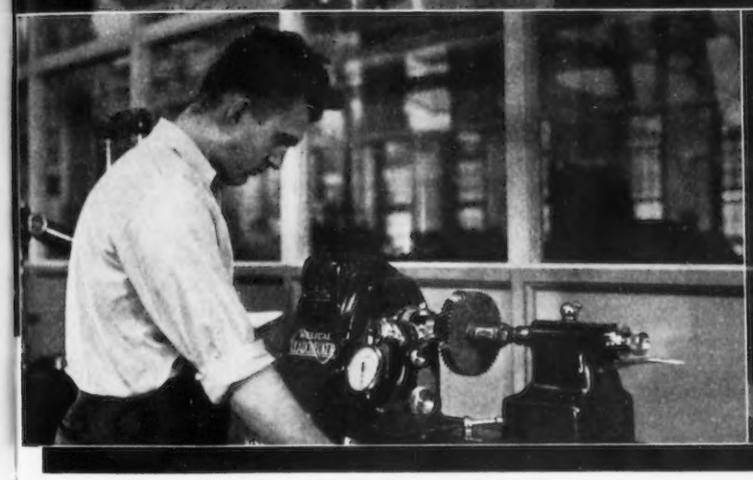

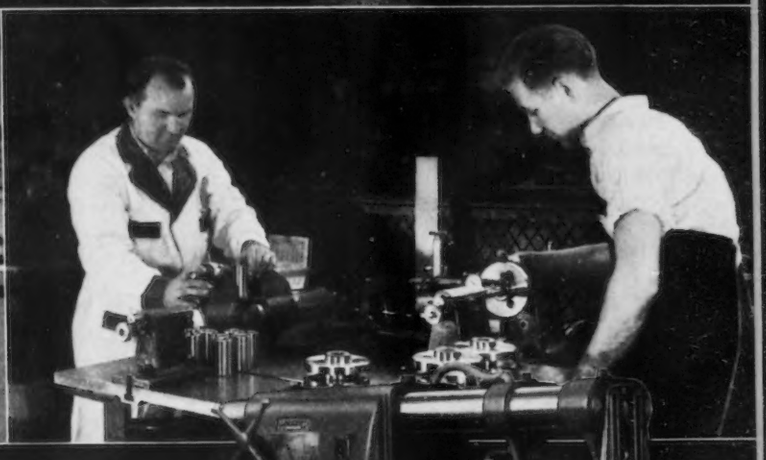

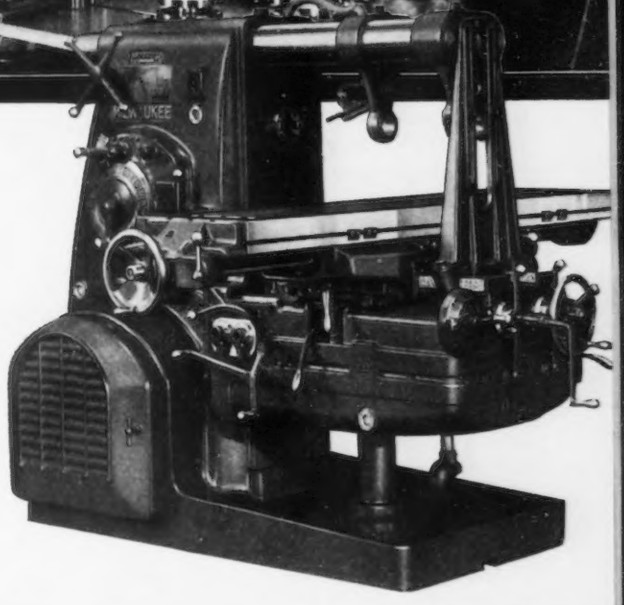

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On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• Revival in late May supports belief that big defense program will increase automobile sales. Detroit buying of materials, except steel, more active. Chrysler laboratories opened. New aircraft projects appear.

DETROIT — Automobile sales through retail outlets have bounded upward again, offering assurance that the setbacks reported from European battlefields and stock markets will have no immediate or permanent effect on automobile production. Revival of sales in the latter part of May also substantiates a widely held theory that a big defense program is more likely to accelerate automobile sales through increased payrolls than it is to force auto production downward when some plant space is devoted to munitions or military truck production.

Pontiac retail sales during the last 10 days of May exceeded earlier estimates of company executives and showed a gain of 35.6 per cent over deliveries in the second 10-day period in the month. The total for May was reported by Pontiac to be 22,516 cars, a gain of 42.6 per cent over that of May, 1939. Similarly, gains are reported by Chevrolet and Buick which have already prepared and released statistics for last month. Chevrolet finished the month with a record of 92,764 sales to retail customers, of which 35,751 were made in the last 10 days. Earlier it had been announced that the initial 10-day period of the month had resulted in the delivery of 30,299 vehicles. While figures have not been released for the second 10-day period, it is indicated that sales during the mid-month interval dropped to 26,714. Pontiac figures for the three separate 10-day periods indicate that sales dropped from 8604 in the first period to 5904 in the middle interval and then rebounded to 8008. Buick entered June with nearly 5000 unfilled orders on hand after having sold 26,072 cars during the month, registering "a sharp increase over the previous (mid-month) period."

More Long-Term Buying

INDUSTRIAL buying during the last month has moved somewhat bullishly, with more long-term buying a feature of the entire Detroit field except in steel, because 1941 requirements had not yet been plotted. Hand-to-mouth buying and 30-day buying each decreased, the former from 12 per cent in April to 7 per cent in May and the latter from 13 per cent to 7 per cent. Buying two months in advance increased from 29 per cent to 32 per cent; three months in advance increased from 38 per cent to 40 per cent. In the six-month bracket there is a four-point gain, to 11 per cent. Three per cent of purchasing in the area was scheduled on a nine-month basis. These figures, supplied by the Purchasing Agents Association of Detroit, represent a substantial improvement over the conditions existing two months ago, when 65 per cent of the buying in this area was being held within 60-day limits. Now only 46 per cent is within the 60-day limits.

Chrysler's two new engineering buildings which place it foremost in facilities for automotive research —were dedicated last week by Fred M. Zeder, vice-chairman of the board, to the corporation's founder, Walter P. Chrysler. In an address at the opening ceremonies Mr. Zeder pledged "our laboratories along with those of the rest of industry to serve us as a first line of defense, as fortifications that science (of warring nations) must recognize. We must fight science with science." He added dramatically, "This new brand of warfare, predicated on mechanization, is right down our alley!"

Digressing from what might have been merely a formal address on the occasion of the opening of the new laboratories, he asserted that America has the personnel, technical ability, materials and facilities to wage a good fight to preserve peace, and warned against "falling for" slogans, sugar-coated false doctrines and theories that we can get something for nothing.

Presiding at luncheon with 300 newspaper men, K. T. Keller, president of the corporation, stated that "These new engineering facilities suggest the broad reaches to which Chrysler Corp. engineers may extend their genius in the application of scientific research both to the benefit of the motoring public and to the aid and development of our national defense program."

Aviation Laboratory Sought for Detroit

DETROIT again is one of the bidders for establishment of a Federal aeronautical laboratory, this time one devoted specifically to engines rather than fuselage and wing structures. A short time ago the city was unsuccessful in seeking the establishment of testing laboratories similar to those now operated by the National Advisory Committee for Aeronautics at Langley Field, Va. On that occasion a site was picked at Sunnydale, Cal. Neither the Langley Field nor Sunnydale laboratories is equipped to deal specifically with motors, confining most of their activity to aerodynamical and structural considerations. Since Detroit is a gasoline motor center, it has first call on the world's greatest group of engine theorists (whose work would be the most important part of any engine laboratory set up), there is reason to believe that the city should be successful in seeking establishment of the laboratory here.

TITAN

SPANS TWO EUROPEAN WARS

The modern Titan started his career in 1915 amid the uproar of a general European war. His 25th anniversary in 1940 is now marked by a second European war.

The greatest contribution of Titan, however, has been in the span connecting those two events. A span devoted to the industrial arts of peace.

These war-like milestones are symbolic of a Titan's never-ending battle to improve the metallurgical products for which Titan stands—Brass and Bronze Rods, Forgings, Die Castings and Welding Rods.

Twenty-five years of specializing in this one task has resulted in prompt service to users of high grade brass and bronze products over a wide area. Titan Brass and Bronze will move on to even higher metallurgical achievements. This is our promise to you as we start our 26th year.

TITAN METAL MANUFACTURING CO.

BELLEFONTE, PENNSYLVANIA

Brass and Bronze Products • Rods • Forgings • Die Castings • Welding Rods

President Roosevelt has recommended and Congress has incorporated in the pending deficiency appropriations bill, an immediate allowance of $2,000,000 and authorization of an additional $6,400,000 for this purpose. No site has been designated and the NACA will ultimately decide that point. It is understood that plans call tentatively for a laboratory covering between 80 and 100 acres, costing $8,400,000 and adjoining an airport to permit flight tests. Besides usual engine testing facilities, it would have a large wind tunnel for making tests involving engine-nacelle drag (wind resistance) and for determining cooling conditions.

New Aircraft Projects Sponsored

WHATEVER may be the outcome of all the rumors about Detroit becoming a center for aircraft production under Federal auspices, there is a boom already going on under private sponsorship. Initiative, technical ability, production skill and the desire to resume aircraft production in this area have not been lacking, but apparently some special incentive was required to get plans to blossom forth the way they have in the last week or so. On the heels of Henry Ford's statement that his company could make 1000 airplanes a day, it was learned that William B. Stout, designer of the tri-motor, all-metal airplane which Ford started to produce more than a decade ago, has completed plans to go into production on a hydramatic welded, stainless steel airplane which has evolved from the radical principles he demonstrated in the all-metal Ford and in the pusher type (propeller in rear) Stout Skycar with its tricycle landing gear, since used on one of the world's largest airplanes to permit safer and easier landings. Gathering around him a group of his former engineers, Stout is pushing to completion plans to get underway with the new Stout Skycraft Corp.

Perhaps a dozen new aircraft projects have been sponsored in the vicinity of Detroit recently, but many of them are still in a nebulous stage. First Michigan firm established after the President's "50,000-plane" speech, was Tucker Aircraft Corp., Detroit. This was incorporated to do a general aircraft business and a general munitions business. It has no plant, no models, but is reported to have a paid-in capital of $510,000 with authorized capital set at $1,000,000.

An old, established plant in Detroit, formerly used by Continental Motors Corp., is to be retooled for use immediately by Continental Aviation and Engineering Corp., a recently incorporated subsidiary of Continental Motors. The parent plant moved last winter to Muskegon, Mich., to consolidate its activities on aircraft engines and submarine power plants of the diesel type.

Another case of expansion is that of Hayes Industries, Inc., Jackson, Mich., which currently manufactures about 70 per cent of the wheels and brakes used on airplanes in this country. An additional 9000 ft. of floor space will be added to present facilities which cover 60,000 sq. ft.

Also in the direction of expanded operations in aviation is the move by another company, Hayes Mfg. Corp., Grand Rapids, Mich., in acquiring McCauley Steel Propeller Co. of Dayton, which supplies solid steel propeller blades for Army training planes. General Motors, so far involved directly in military production only to the extent of its Allison aircraft engine, has entered the airplane propeller business through its acquisition of Engineering Projects, Inc., Dayton. The new unit will be known as Aeroproducts Division of General Motors.

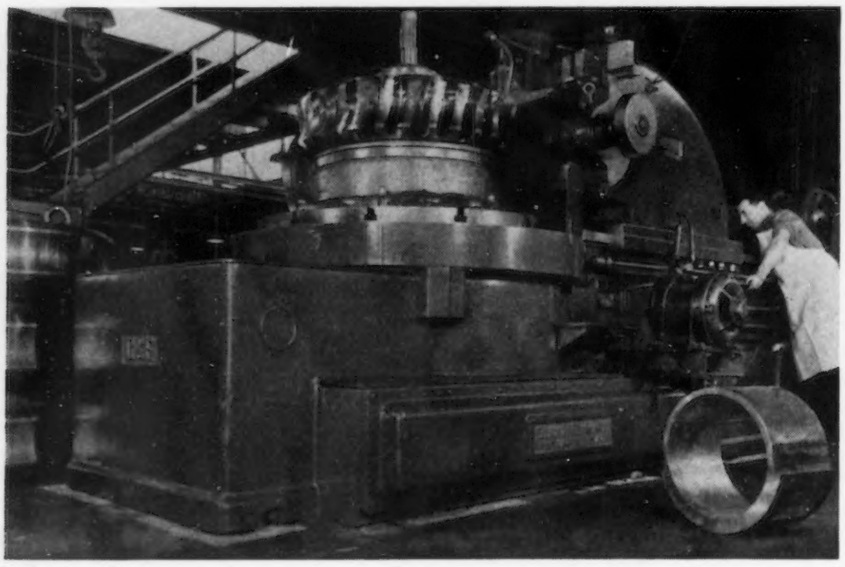
Aviation Corp., of which Stinson Aircraft Co. is now the most noted subsidiary, also is fast growing into a well-rounded organization. It has now acquired the physical assets and trade name of Barkley-Grow Aircraft Corp. Continuance of airplane production is thus assured in the former Stinson plant at Wayne, near Detroit, for the B-G plant is going to be moved by the new owners from the present hangar site at the Detroit City Airport. Stinson began moving several months ago to a new plant at Nashville, Tenn., and its plant was nearly vacated when the purchase of Barkley-Grow was announced.

Pressure of aviation business has probably had more than a little to do with a foundry expansion announced by Dow Chemical Co., of Midland, for its plant at Bay City. The addition will be a foundry 80 x 200 ft. and costing $100,000. The building will be used for core making and casting magnesium alloys.

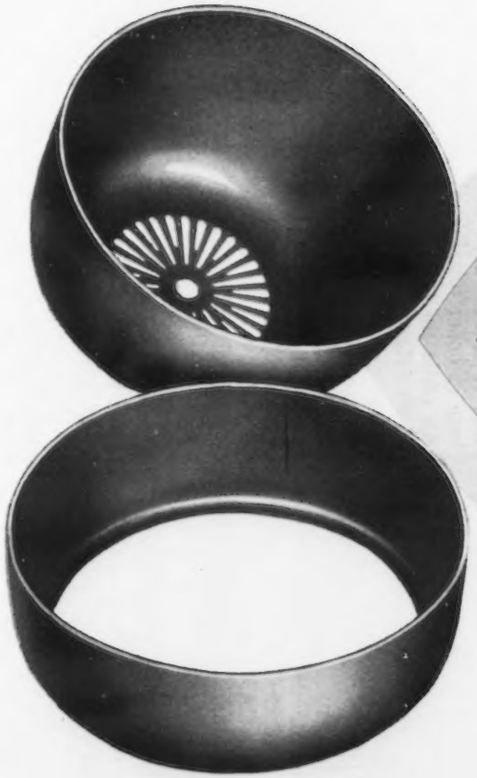
With more vigor than anticipated, automobile production rebounded last week.

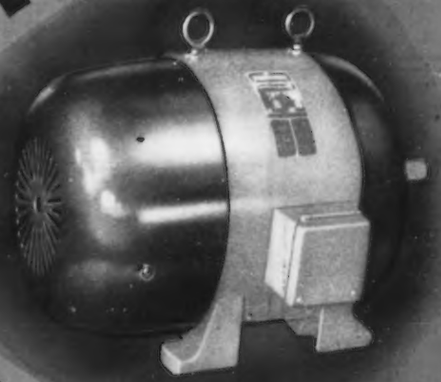
Output for the industry in passenger cars and trucks was estimated at 95,560 for the week, compared with only 60,980 in the previous week and 65,265 a year ago, according to *Ward's Automotive Reports.*

DOUBLE enveloping worm gearing capable of handling 6000 to 8000 hp. in a single reduction is reported available for the first time in the worm gear field as the result of the development and installation at Michigan Tool Co., Detroit, of this new cone-drive worm and gear hobber. The new machine will handle gears up to 90 in. in diameter, worms up to 20 in. in diameter, shanks up to 15 in. Maximum center distance is around 50 in.; ratio around 7½ to 200 to 1. A cone-drive of this center distance and 7½ to one ratio will handle roughly 7500 hp. at 1800 rpm.



STREAMLINED STAMPINGS





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Washington

BY L. W. MOFFETT
Washington Editor

• Reduction in number of special steels is among first problem of National Defense Commission. Dr. Briggs, Standards Bureau head, says consumers' recommendations will be sought. SAE cooperates

WASHINGTON—Among the first problems to be faced by industry members of the newly created National Defense Advisory Commission may be one concerning a reduction in the number of types of special steels in a standardization move designed to speed aircraft production and put the manufacture of war-time equipment on a production basis.

Edward R. Stettinius, Jr., commission member in charge of raw material production, and William S. Knudsen, whose job concerns the elimination of bottlenecks in fabrication, have made no formal announcements, the commission still being in the preliminary stages of organization, but that the subject is already under discussion by other government officials was indicated last week by an assertion that the mass production of special steel is handicapped by the variety of types and kinds of steel demanded by various industries.

In fact, other government agencies already are sponsoring a program to reduce the number of special steels. Thus far it is proceeding purely on a voluntary basis, the motivating force being the National Advisory Committee for Aeronautics, but War and Navy Department experts reportedly are keeping developments under close scrutiny.

As an initial step the NACA, created some years ago for the purpose of conducting aeronautical research and confidential studies for the Army and Navy, has asked for the assistance of the Society of Automotive Engineers. The engineering society, promising full cooperation, already has started the ball rolling and is understood to have sent out some inquiries to affected companies. Cooperating is the American Society for Testing Materials.

Lack of Standardization Found Costly

THE Bureau of Standards, governmental agency whose interests include standardization of materials, also is an active participant. Dr. Lyman J. Briggs, director of the bureau and chairman of the committee on materials of the NACA, asserted last week that the present lack of standardized types of special steel costs money, slows up production and increases overhead.

Dr. Briggs, speaking before the 13th national conference on weights and measures, an organization sponsored by the bureau, said:

"Within the past week I attended a technical conference on airplane development, in which it was pointed out that the mass production of steel in this country is seriously hampered by the multiplicity of types and kinds of steel demanded by the various industries. I am convinced that this great list of special steels can be drastically reduced without impairing any important product, and that costs will be lessened and production increased thereby. Steps are already being taken to this end."

In elaboration of this statement, Dr. Briggs told THE IRON AGE that government representatives have no preconceived notions of what the number or types of special steels should be but that the job is being largely turned over to steel consumers. Any plan finally approved will be based on these recommendations, he said. Such a procedure would be strictly in accordance with the policy customarily followed by the bureau in requesting cooperation from business groups on a purely voluntary basis.

Part of the bureau's regular assignment consists of development and research work on engines, fuels, aircraft; conducting chemical tests on steel and nonferrous alloys; cooperating with business groups in eliminating unnecessary variety of products through the development of standardized manufactured products; providing a testing service on metals and studying metallurgical problems; finding the proper industrial application for products and developing alloys for new and unusual conditions.

War Creates a Different Situation

THE situation today, Dr. Briggs explained, "is different than during normal peace-time operations, when it is desirable that a good deal of latitude be given in order to take advantage of new materials that may come on the market. Now, however, we should concentrate on the selection from the large number available of just which materials will meet present requirements, thereby relieving the load imposed on manufacturers producing an enormous number of special steels, some of which require special heat treatment."

Two divisions of the SAE which are currently working on the standardization problem are the iron and steel division and the aircraft materials division.

Members of the SAE gathering this week at White Sulphur Springs, W. Va., for their summer conference met in an atmosphere of national defense planning of which reduction of special steels was only one phase. Virtually every speaker emphasized the necessity of haste in rearming, and of the need of clearing the ways for mass production of war materials.

"I want Easy Roll MonoRail!"

"You mean American?"

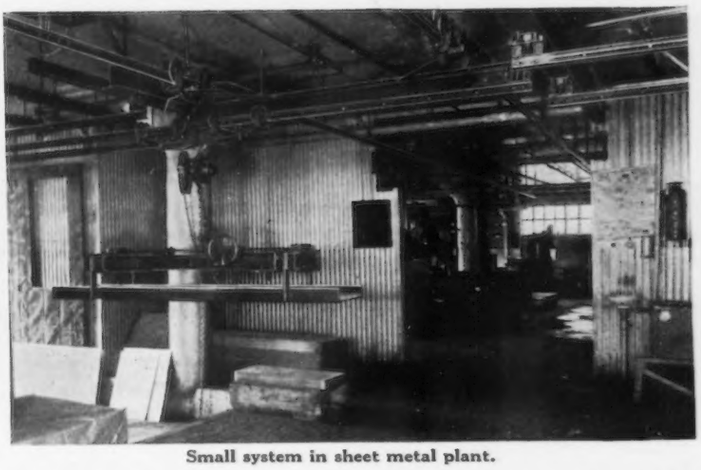
"Sure, that's it! The track we put up the other day—the gang in the shop says the trolleys are so easy to push."

"That's right! I saw the first guy try it out. His load got away from him and rolled 30 feet down the track before it stopped. I guess he was used to our old rail."

This actually happened in a large automotive plant where they originally installed their own overhead system. They now call for "Easy Roll" track, a name they coined after the above experience.

American MonoRail is "Easy Roll" because it's a high carbon, twin section rail, with overlapping splice to eliminate butt joints and a one piece forged hanger clamped in the rail head to prevent interference with trolleys. Trolleys "Roll Easy" because they contain precision bearings.

Let an American MonoRail engineer show you these features and explain the cost saving advantages of specialized overhead handling equipment.



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U. S. Studies Plans To Curb Forced Barter Deals In S.A., If Nazis Win

Washington

• • • **Not overlooking** the implications of German economic and political domination of Latin-American countries in the event of a complete Nazi victory in Europe, Government officials are understood to have under advisement the creation of an economic inter-American organization to prevent such an eventuality by attempting to curb forced barter agreements.

The proposal under consideration presumably would involve the establishment of an inter-American trading corporation or some similar unified organization, entailing a cooperative mechanism for handling the export trade between the United States and other American countries.

This country would have to bear the lion's share of financing the plan. State Department representatives, however, express the view that the cost involved would be relatively unimportant when weighed from the standpoint of protection against German economic and political pressure in South America.

Moreover, such a system of unified action is regarded by these officials not only as good insurance but as imperative to throw the economic strength of this country against Nazi penetration. They point out that if individual South American countries are required to trade with Germany on Nazi-dictated terms, the economic implications and the concomitant dangers even to sovereignty would be great.

The program, as outlined on the basis of preliminary studies, would call for certain economic adjustments to eliminate in the export field competition between countries in this hemisphere. On products on which these countries compete in world markets the allocation of export quotas might be necessary, it was explained.

Rough figures used as a foundation for considering the proposal show that total exports of Latin America amount to $2,000,000,000 annually, of which $650,000,000 worth go to the United States and $200,000,000 to other American countries. Based on a belief that inter-American trade would be maintained on a normal basis, only the remaining inter-American trade, aggregating about $1,150,000,000 annually, would be handled by a central trading corporation.

While the economic shock of such a development admittedly be pronounced, it was said that any plan to cushion the jolt would necessarily involve mutual sacrifice from the beginning.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

NOW THIS MACHINE IS ALMOST ENTIRELY AUTOMATIC--YOU DON'T HAVE TO DO VERY MUCH BUT JUST KEEP YOUR EYE ON IT-AN'---
THEM COLLEGE KIDS IS TAKIN' MECHANICAL ENGINEERIN'--WHEN I WAS A KID A COLLEGE GUY WAS A RARITY WHEN WE REALLY NEEDED 'EM, BUT NOW, WHEN EVERYTHING IS FIXED SO IT DON'T TAKE MUCH THINKIN', THEY'RE TURNIN' 'EM OUT BY TH' THOUSANDS EVERY YEAR!
JUST TH' SAME AS GAS STATIONS ER CHICKEN FARMS--IF ONE GUY IS MAKIN' A LIVIN', PRETTY SOON EVERYBODY GOES INTO IT--THEN NOBODY MAKES A LIVIN'--ONE GOOD LIVING MAKES A THOUSAN' POOR ONES!
THE THINKING MACHINE
T. M. REG. U. S. PAT. OFF. COPR. 1939 BY NEA SERVICE, INC.
J.R.WILLIAMS 6-14

Government Orders

Washington

• • • Government contracts for iron and steel products, as reported by the Labor Department's Public Contracts Division for the week ended June 1, totaled $742,305. For the same period contracts were reported totaling $11,103 for non-ferrous metals and alloys; and $213,037 for machinery. Details follow:

Iron and Steel Products

The Steel Improvement & Forge Co., Cleveland, steel forgings, $15,950; Crane Co., Washington, D. C., tube fittings, $46,405; American Steel & Wire Co. of New Jersey, New Haven, Conn., wire rope, $22,357; Union Wire Rope Corp., Kansas City, wire rope, $27,598; Armstrong Cork Co., Lancaster, Pa., machined shell, $81,311; The Murray Co., Atlanta, machined shell, $91,206; The Harvey Metal Corp., Chicago, body forgings, $14,175; Lindberg Engineering Co., Chicago, stress-relieving furnace, $10,844; Russakov Die Casting Co., Chicago, practice bombs, $71,400; Sheffield Steel Corp., Kansas City, structural steel, $11,986; Pittsburgh Forgings Co., Coraopolis, Pa., forgings for shell, $36,364; The Colorado Fuel & Iron Corp., Denver, reinforcement bars, $17,659; Lakeside Bridge & Steel Co., Milwaukee, radial gate hoist, $14,944; Gifford-Wood Co., Hudson, N.Y., selector boxes, $36,092; The Crosby Co., Buffalo, reel, $51,024; Blaw-Knox Co., Pittsburgh, antenna towers, $37,500; Peter Gray Corp., Cambridge, Mass., steel boxes, $14,-

343; Minneapolis-Moline Power Implement Co., Minneapolis, machined shell, $141,142.

Non-Ferrous Metals and Alloys

J. M. Tull Metal & Supply Co., Inc., Atlanta, bronze flanges, $11,103.

Machinery

Rockford Machine Tool Co., Rockford, Ill., planer-shaper, $11,715; Pratt & Whitney Division, Niles-Bement Pond Co., West Hartford, Conn., toolmakers lathes, $13,888; The Fellows Gear Shaper Co., Springfield, Vt., shaper machine, $13,273; Koehring Co., Milwaukee, concrete mixers, $11,880; Buda Co., Harvey, Ill., earth boring machines, $17,942; Evinrude Motors, Milwaukee, outboard motors, $12,800; Modern Tool & Die Co., Philadelphia, punches, $12,926; Climax Engineering Co., Clinton, Iowa, power unit, $17,986; The Osgood Co., Marion, Ohio, dragline excavator, $10,447; The Foote Co., Inc., Nunda, N. Y., pavers, $41,976; Link-Belt Speeder Corp., Chicago, power shovel, $19,200; Robert Abel, Inc., Boston, crane systems, $16,119; Cleveland Crane & Engineering Co., Wickcliffe, Ohio; Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.; Ex-Cell-O Corp., Detroit, pumps, $12,885.

Vinson Bill Profit Limit Not For Contracts Under $25,000

Washington

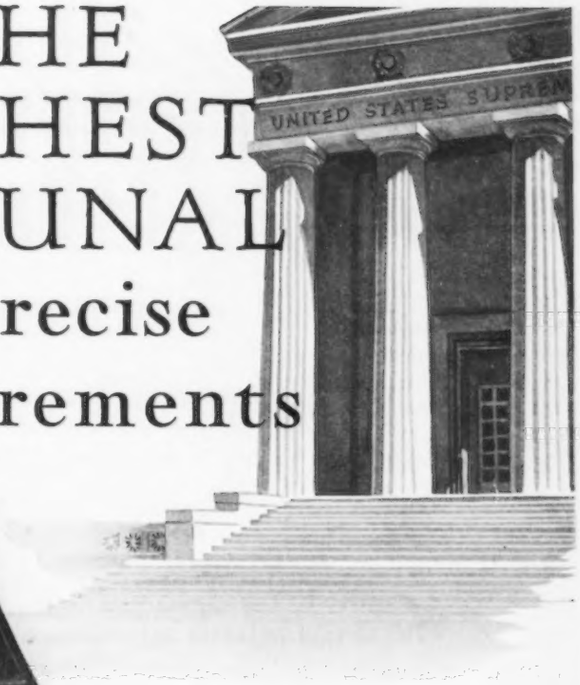
• • • **Inadvertently** THE IRON AGE of June 6, page 72, said that naval contracts or subcontracts exceeding $25,000 would be exempted under the pending Vinson bill to expedite shipbuilding from the profit limitation provision of the Vinson-Trammell act. The contrary is true. The exemption is limited to contracts or subcontracts where the award is $25,000 or less.

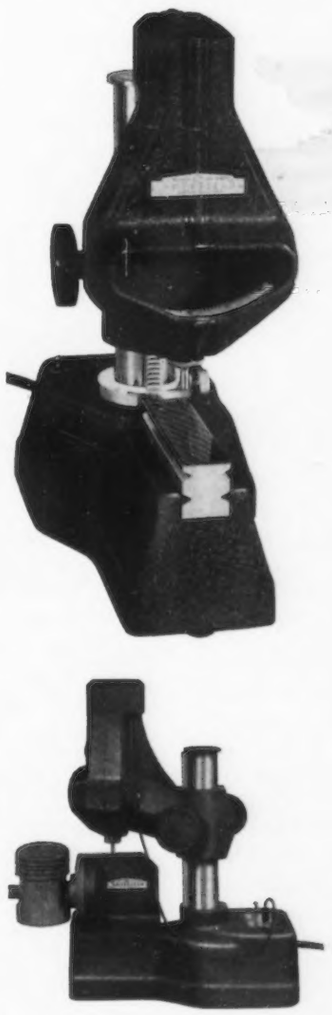
U. S. Purchases 12,500 Tons of Chromium Ore

Washington

• • • **Award of a** contract for 12,500 gross tons of chromium ore at $24.50 per ton to E. J. Lavino & Co., Philadelphia, agents for the Rhodesia Chrome Mines, Ltd., was announced June 1 by the Procurement Division. The contract total was $306,250. This award was made on the bids opened May 24. The ore will be delivered f.o.b. cars, Philadelphia Harbor, Philadelphia.

THE HIGHEST TRIBUNAL in precise measurements





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In addition, the Sheffield Gage has greater capacity and greater flexibility than other precision gages, although these advantages do not carry with them the penalty of higher costs.

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Fatigue Cracks

BY A.H.DIX

Up From The Depths

• • • In response to a faint demand on the part of the eighteen loyal readers of "Just Between Us Two," that column has been moved about fifty pages nearer to your left hand and will appear hereafter under the title of "Fatigue Cracks," which is three letters shorter and also mildly punny, we hope.

Bucket Brigade

• • • "It seemed to the lay observer," reads a London dispatch in the New York *Times* regarding a British small arms factory, "that many jobs were being done by hand that might be done by machines. But officials said that machines were used wherever possible. In one case a line of several men passed rifles from hand to hand for packing. It was said that this was found to be the quickest and cheapest way."

Anyway, it's better than pushing them along with your nose.

Piscatorial Note

• • • The very day an ad appeared touting a certain industrial maintenance material a manufacturer telephoned the advertiser to send over a salesman, and within an hour the salesman was back in the plant with an order.

Our representative writes, "Ought to be worth a *squid* in your column." O.K., but look out when it shoots ink.

Pulpit Note

• • • The feud over who wrote *"If a man has good corn, or wood . . . you will find a broad hard-beaten road to his house, though it be in the woods,"* is petering out for lack of shells.

As we understand it, the quotation can't be found in any of Emerson's writings, but a lady said she heard Ralph Waldo give it in a sermon and made a note of it, which is too bad as it is responsible for the death of many a worthy product that could have been saved by judicious horn-blowing.

It has always seemed to us somewhat extravagant anyway, as we cannot conceive of anyone bothering to beat a path through the woods for corn. Of course, it is possible that Emerson used the word as an ellipsis for "corn liquor."

Gladdest Words . . .

• • • Our favorite after-dinner speech is "Put it all on one check."

—Geometric Tool Co.'s "Threads."

Drollery From Dayton

• • • We expressed our mystification recently concerning "anti-proof shelves," listed in Dun-Bradstreet's as the product of an Oakland, Cal., manufacturer. *"They are,"* writes Dwight (Duriron) Spofford, *"what the President's cabinet is lined with."*

Orchid -- With One Mosquito, Small Size

• • • "The trouble with THE IRON AGE being so good is that one is forced to look for only picayune peccadilloes, like the error in setting prices of British steel on page 103 of your Mar. 14 issue. You start off with £17.18s., which is correct, but then you change to 17£.18s., which isn't right. Looks like a man with his pants on wrong side to the front."

—R. W. Osborn, Pretoria, South Africa.

Sorry. The error won't be repeated, as we had the proofreader stay after five and write 25 times on his blackboard, "Sterling sign first, pounds next, then come shillin's, and the shillin' sign larst." Which reminds us that something should be done about the English practice of putting the day before the month in expressing a date numerically. When they write "12/-6/40" they mean yesterday, not Dec. 6, which is very confusing and leads to international ill-feeling.

Squawk

• • • An anonymous Chicagoan who signs himself "S.W." and who carries a torch for the U.S.S.R., goes through the issue each week as soon as he gets it and sends us a pencilled note listing our waverings from the straight party line.

Sample:

"I am surprised to see you going for the dialectical materialism of Karl Marx. The cornerstone of Marxian dogma is that the only sure thing in the world is change. *Vide*, the heading on your 'Personals' page, 'Change is inevitable in progressive industry. Change is constant.'

"It would be queer if it were true only in the technical and personnel relations of industry and not in its social relations as well. Now wouldn't it?"

It's hot and the Dodgers are skidding. This is no time for bickering.

Irreducible Minimum Gets It Done

• • • A reader asks us to underscore this timely observation in a recent "The Bull of the Woods" cartoon:

"One man can lick twelve if all twelve try to do the thinking."

This is of a piece with Hendrik Van Loon's "To get something done appoint a committee of three and insure that one member is absent and one is sick," and Charles F. Kettering's "The surest way to kill an idea is to get a committee working on it."

Puzzles

• • • Up to this writing we haven't been able to figure out last week's bridge problem, as we had time to toy with it for only a couple of hours.

Nor can we get straight in our minds the one about A who starts at $1,000 a year and gets a raise of $20 a year, and B who starts at the same salary and gets a raise of $5 every six months. A ought to make more, but when you put it down on paper B tops him $5 every year:

	A	B
First six months	$500	$500
Second six months	500	505
First year	1000	1005
Third six months	510	510
Fourth six months	510	515
Second year	1020	1025

It keeps right on that way with B making $5 a year more, despite the fact that A gets a $20 a year raise and B $5 every six months.

This trifle will keep your mind off the war news only five minutes:

A train is half a mile long. It leaves station A, and the conductor waits until the train has just left A and jumps aboard the rear end of the train. He walks forward in the train while it is in motion, and alights at the engine as the train enters station B, four miles away.

How far did the conductor ride?

"SALEM" is prepared for defense!

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"Salem" designs, contracts, builds and offers consulting service.

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SALEM ENGINEERING COMPANY

News of Industry . . .

CLAYTON R. BURT, president of the Pratt & Whitney division, Niles-Bement - Pond Co., is chairman of the National Machine Tool Builders Association's defense committee.

Machine Tool Exports Rise 140% As Nations Prepare for Conflict

• • • **Monthly exports** from the United States of power-driven metal working machinery reached the new record value of $21,281,-332 in April, representing an increase of 140 per cent over shipments in the same month of 1939 when they totaled $8,854,755, according to the Machinery Division, Bureau of Foreign & Domestic Commerce.

This expansion was reflected in all export classifications, some items showing an increase of 600 per cent. The accompanying table (see page 65) shows the distribution of machine tool exports by class of machine and the principal consuming countries, by dollar value of shipments for the first four months of 1940. It would not be correct to project these figures for the full year by multiplying by three.

Heavy French purchases were made last fall, for example, and shipments did not begin to reflect the true demand until March. This is particularly true of engine lathes; April shipments were almost double those of January. This was because it took many months for certain machine tool builders to work up to their ultimate monthly quotas. It is probable that in the meantime these quotas have been revised upward. Of course, the exigencies of war may alter this picture entirely.

Shipments to Russia, on the other hand, are likely to decline as the year progresses. Purchases during May had dwindled to a mere trickle, compared with months in 1938 or 1939. This situation was partly due to the fact that the Russians have been shipping U. S. machine tools from New York, through the Panama Canal and across the Pacific to Vladivostok, thence by trans-Siberian railway to the industrial centers in European Russia. This method is time consuming and costly. Besides, since September there has been a decided reluctance on the part of many manufacturers to do business with the Russians. It would appear also that Russia is able to satisfy a great deal of its present machinery needs in Germany.

Shipments to Japan may be affected by passage of the pending May-Sheppard Bill, originally prepared as a measure to license the exportation of scrap iron and steel, but lately expanded in its provisions to include all materials essential to industry, including machinery and tools necessary for the manufacture of equipment for our own defense. The proposed Vinson Bill will also permit the Navy to restrict the export of machine tools needed for naval construction.

For the past several years, the British have been buying machine tools principally for aircraft engine manufacture. Oddly enough, up until last summer, they had been getting from Germany a large part of their shell-turning equipment—heavier, faster and more powerful than anything heretofore manufactured in the United States.

Some of the biggest presses ever built in this country were shipped to Russia in 1939 for fabricating aluminum stampings for airplanes. Also in that year some of the largest machine tools ever constructed were consigned to the U.S.S.R. for the manufacture of large calibre guns. At the present writing, identical presses for cartridge case forming are going east to Great Britain and west to Vladivostok. In the future much of such equipment will undoubtedly remain here for building up our own defense machine.

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Machine Tool Industry Lined up for Defense

Cleveland

• • • **An orderly procedure** for manufacture of machine tools for national defense has now been established and production will go forward rapidly as soon as specific requirements are determined, it was announced on June 5 by Clayton R. Burt, chairman of the defense committee of the National Machine Tool Builders Association and president of Pratt & Whitney division, Niles-Bement-Pond Co., West Hartford, Conn.

"The production plan," Mr. Burt said, "was developed in conference with William S. Knudsen, of the government's Advisory Defense Commission in charge of manufacturing." The plan follows:

"1—**Setting up** of a machine tool

co-ordinating committee, with Mr. Knudsen as chairman, and Harold S. Vance, chairman of the board of the Studebaker Corp., as vice-chairman; two representatives from the defense committee of the machine tool industry, two representatives from the Navy and two representatives from the Army.

"2—**This co-ordinating** committee will then determine the requirements of the Army, the Navy, United States manufacturers and foreign consignees, and establish priorities for the guidance of the machine tool industry in filling these requirements.

"3—**It is anticipated** that Congress shortly will pass a law authorizing the Navy to requisition for national defense purposes machine tools now on order for foreign customers.

"4—**The machine tool** industry will undertake to make deliveries in time to meet the requirements of the national defense program by expanding present working forces and facilities, and by subletting production of parts, and, if necessary, complete machines, to various factories not engaged in important government work.

Coming Meetings

June 9 to 14—Society of Automotive Engineers summer meeting, White Sulphur Springs, W. Va.

June 10 to 13—American Electroplaters' Society, annual convention, Dayton, Ohio.

June 17 to 20—American Society of Mechanical Engineers, semi-annual meeting, Milwaukee.

June 24 to 28—American Society for Testing Materials. 43rd annual meeting, Atlantic City, N. J.

June 25 to 29—Production and Machine Tool Show, Cleveland.

July 22 and 23—Institute of Scrap Iron and Steel, mid-year meeting, Buffalo.

"5—**The industry** also will inaugurate a comprehensive program of training the additional men required to speed up production.

"The program covers not merely machine tools to be purchased by the Army and Navy, but the entire needs of the United States. Orders direct from the Government will represent only a small share of machinery actually needed for national defense. The largest portion will be those required by manufacturers of aircraft, munitions and other types of defense equipment under contract from the War and Navy Departments."

Principal Exports of Metal Working Machinery for First Four Months of 1940 to Leading Buying Countries

(In thousands of dollars)

	United Kingdom	France	Russia	Japan
Engine lathes	$1,014	$1,837	$1,145	$474
Turret lathes	1,810	1,153	314	922
Other lathes	825	678	9	328
Vertical boring mills and chucking machines	1,203	510	859	323
Thread cutting and automatic screw machines	1,415	2,579	293	299
Knee and column type milling machines	952	570	105	953
Other milling machines	1,931	1,453	515	440
Gear cutting machines	828	357	694	434
Vertical drilling machines	409	336	227	30
Radial drilling machines	86	379	55	209
Other drilling machines	438	287	285	185
Planers	228	241	44	109
Shapers	228	222	19	141
Surface grinding machines	472	531	243	272
External machines, cylindrical grinding	449	436	998	345
Internal grinding machines	1,584	367	441	546
Tool, cutter and universal grinders	889	460	383	327
Other metal grinding machines*	1,315	859	391	473
Sheet and plate working machines*	423	477	1,118	38
Forging machinery*	390	777	488	291
Other power driven machines*	3,472	1,258	492	890
Rolling mill machinery*	607	16	697	3,258
Total	$20,968	$15,783	$9,815	$11,287

*Including parts.

Source: U. S. Department of Commerce.

Milling Machines and Lathes Lead Exports

• • • **Detailed figures** on metal-working machinery exports from the U. S. for April, 1940, and April, 1939, follow:

Detailed figures for April, 1940, and April, 1939, follow: Lathes, $3,823,750-$1,104,093; milling machines, $2,173,723 - $1,520,573; thread-cutting and automatic screw machines, $2,078,130-$318,433; vertical boring mills and chucking machines, $843,652-$291,093; gear cutters, $678,213-$198,952; vertical drilling machines, $1,400,979-$187,249; planers and shapers, $429,766-$348,268; surface grinders, $519,932-$185,753; internal grinders, $946,807-$271,892; external cylindrical grinders, $813,712-$392,978; tool, cutter, and universal grinders, $502,455-$392,978; other grinders, $1,090,954-$310,367; sheet and plate metal-working machines, $1,020,457-$661,681; forging machinery, $805,763-$615,961; rolling mill machinery, $1,867,793-$1,476,816; and foundry equipment, $155,104-$89,477.

Detroit Prepares For War Workers Migration

Detroit

• • • **To prevent** an unwarranted migration to Detroit of workers seeking employment as a result of the potential war boom in automobile and other factories, the Detroit City Council last week took tentative steps in a "Hire Detroiters" campaign. The council, through the mayor, is urging factory employment managers to contact Welfare and WPA officials after they have called back men already on the factory lists. The council has also asked that those factories not already doing so, demand that job applicants provide Detroit Election Commission registration cards as proof of residence.

Road to Security Hard But U. S. Must Drive Ahead, Johnson Warns

Assistant Secretary of War Johnson addressing the N.A.P.A.

By T. C. CAMPBELL

o o o

Cincinnati

• • • **With the real** significance of the European conflagration dawning on the American Public, those attending the convention of the National Association of Purchasing Agents here last week were told what lies ahead of them as purchasing agents and industrialists.

Speaking realistically on the government's preparedness program, Louis Johnson, assistant secretary of war, said: "Our ultimate objectives we shall not achieve in a day, or in a month, or even in a year. I doubt if they will be fully realized in less than two years; and two years is indeed a long time, especially in an era of 'blitzkriegen.' That is the situation, however, and we must face it frankly and honestly, and then proceed with characteristic American energy to attain the desired goal of national defense with a minimum of delay. In the last year, we laid the foundations. Today, we are ready to start on the superstructure; and we have the advantages of the battlefield laboratories of Europe to guide us in our plans.

"National defense is at the crossroads. It is heading in the right direction. The road is long and the going may be rough. We must travel it at the maximum speed compatible with safety and efficiency and we must see to it that it remains true to the course of adequate preparedness. We must assure ourselves that at the end we will find an America ready to meet any military crisis, an America so well prepared on land, on sea and in the air that no prudent enemy will be tempted to attack us, and that no reckless foe will be in a position to defeat us. And when that job is done, you and I, and every patriotic American, will be ready to go back to the plough or to the loom, the spindle or the lathe, and to resume his accustomed role in the life of his community."

Warning the purchasing agents that their's is no easy job in the coming months, George A. Renard, executive secretary-treasurer, National Association of Purchasing Agents, said: "We in the industry may be operating under priorities and controlled prices in the not distant future but that will not remove or even reduce the need for sound procurement. Don't allow the purchasing department to become the bottleneck of your company. It can become just that if the personnel is not adequate and qualified."

With there being a likelihood that steel supplies might be difficult to obtain later on this year, because of substantial export business and because of the U. S. Government armament program, purchasing agents should space their regular steel buying over the coming months so that it will not add to the difficulties of mills endeavoring to meet the Government's needs, Frank H. Carter, purchasing agent, Maryland Drydock Co., told his audience.

"The entire situation places us in a position where we should make a careful survey of our immediate requirements, as well as those for future need and build up an adequate stock to carry us only until such time as the mills will be able to schedule other rollings from which to replace those items which have been consumed in our production program," Mr. Carter said.

Of ruinous price competition in the steel industry in the past few years, N. J. Clarke, vice-president in charge of sales, Republic Steel Corp., said: "There are occasions when any buyer is able to buy at ruinous prices because the salesman is there to get the business at any price. Perhaps he is trying to supplant some long established competitor. Perhaps his management is trying to increase plant operations on the misguided premise that a higher operating rate will somehow return a profit regardless of the realized price. Or he may represent one of those outfits, fortunately becoming less numerous, who do not know their true costs and cannot establish

C. R. HOOK (top), president, American Rolling Mill Co., and N. J. CLARKE (below), vice-president, Republic Steel Corp., were speakers at the Purchasing Agents convention.

the breaking-point between profit and loss.

"I would like to say right here that I consider it to be a sales function, and not a purchasing function to establish fair prices and see that they are maintained.

"I become more convinced that most of the disastrous price breaks which occur from time to time in every industry are due to the sales department's overeagerness to get business rather than to the buyer's insistent pressure for concessions."

Discussing standardization and simplification in the steel industry, R. E. Zimmerman, vice-president, research and technology, United States Steel Corp. of Del., told the purchasing agents that the technical committee of the American Iron & Steel Institute in collaboration with the manufacturing committee is preparing a comprehensive manual which will (1) classify and define the products of the iron and steel industry, (2) collect and present data pertaining to manufacturing tolerances, (3) collect information relative to methods of inspection for each product, and (4) review existing specifications that might be considered appropriate as current standards in their respective classes.

Scrap Dealers Pledge Cooperation in Defense

• • • **Scrap dealers** met in Washington June 5, at the call of a member of the industry to review the position of the scrap industry in the present defense situation and approved the cooperation already given the government by the Institute of Scrap Iron and Steel. No further action was taken.

May Steel Ingot Output Up 20% To 8,841,403 Tons

• • • **Production of** open hearth and bessemer steel ingots during May rose more than 20 per cent over the month before to a total of 4,841,403 net tons, according to the monthly report of the American Iron and Steel Institute.

Ingot output in April amounted to 3,974,706 tons, while in May, 1939, a total of 3,295,164 tons was produced. Output last month represented an increase of 47 per cent over the May, 1939, tonnage.

During May the steel industry operated at 72 per cent of capacity, which compares with 61.04 per cent in April and with 48.64 per cent in May of last year.

An average of 1,092,867 tons of ingots was produced per week during May, as against 926,505 tons per week in April, and 743,829 tons per week in May, 1939.

In the first five months of 1940 the industry has produced a total of 23,145,214 net tons of ingots and has operated at an average of slightly above 70 per cent of capacity.

	Reported Production (Net Tons)		Calculated Production* All Companies		Number of Weeks	*Per Cent of Capacity
1939	Open-Hearth	Bessemer	Monthly	Weekly		
January	3,344,830	165,193	3,578,863	807,870	4.43	52.83
February	3,085,746	219,728	3,368,915	842,229	4.00	55.07
March	3,547,915	218,057	3,839,127	866,620	4.43	56.67
1st Quarter	9,978,491	602,978	10,786,905	838,795	12.86	54.85
April	3,059,225	230,464	3,352,774	781,532	4.29	51.11
May	3,041,853	190,575	3,295,164	743,829	4.43	48.64
June	3,246,378	209,975	3,523,880	821,417	4.29	53.71
2nd Quarter	9,347,456	631,014	10,171,818	781,846	13.01	51.13
1st 6 Months	19,325,947	1,233,992	20,958,723	810,155	25.87	52.98
July	3,241,186	256,906	3,564,827	806,522	4.42	52.74
August	3,885,787	276,586	4,241,994	957,561	4.43	62.62
September	4,347,352	332,783	4,769,468	1,114,362	4.28	72.87
3rd Quarter	11,474,325	866,275	12,576,289	957,829	13.13	62.63
9 Months	30,800,272	2,100,267	33,535,012	859,872	39.00	56.23
October	5,512,718	453,600	6,080,177	1,372,500	4.43	89.75
November	5,589,235	453,103	6,147,783	1,433,059	4.29	93.71
December	5,358,320	353,250	5,822,014	1,317,198	4.42	86.13
4th Quarter	16,460,273	1,259,953	18,049,974	1,373,666	13.14	89.83
Total	47,260,545	3,360,220	51,584,986	989,355	52.14	64.79
1940						
January	5,262,760	285,714	5,655,315	1,276,595	4.43	84.11
February	4,113,446	205,527	4,409,035	1,064,984	4.14	70.16
March	3,990,510	191,559	4,264,755	962,699	4.43	63.42
1st Quarter	13,369,285	682,800	14,329,105	1,102,239	13.00	72.62
April	3,721,264	176,335	3,974,706	926,505	4.29	61.04
May	4,489,665	258,709	4,841,403	1,092,867	4.43	72.00

*Revised.

Canada Hastens Her War Effort, Will Need More Help From U. S.

By C. E. WRIGHT
Managing Editor, The Iron Age

o o o

• • • **Canada's war effort,** which has been greatly speeded up in the past three or four weeks, is undergoing a further rapid acceleration in which the industries of the United States will be called upon for a greater assisting role. Steel, machine tools and airplane engines will be required in greater volume than hitherto.

On the day that this writer visited Ottawa (June 6) Premier Mackenzie King, Minister of Munitions and Supply C. D. Howe and other Government officials were holding a conference with a committee of the Canadian Manufacturers' Association in a further effort to develop what individual plants may be able to do immediately to bring about a more intensive production of war materiel.

The complete facilities of Canada's automobile industry have been offered by the Canadian Government to the British Government for the manufacture of armored trucks and other motor vehicle equipment. Meanwhile Canadian automobile plants have started work on a new military motor vehicle contract totaling $13,000,000. Munitions Minister Howe stated that the Canadian motor industry is already tooled up for the production of 60,000 military mechanized equipment a year and this production can be substantially increased if necessary.

Canada will begin at once the construction of 300 tanks of a type now in use by the British Government. Instructions to proceed immediately with the work have been issued by Munitions Minister Howe.

Canada's air training program, which has been endangered by events which have required Britain to keep her own airplane engines at home, has received fresh encouragement from successful negotiations for the purchase of engines from American manufacturers. Unofficially the number of engines that Canada will need is stated to be 5000, though deliveries of these may be extended over a considerable period.

It is sadly admitted in Canada—by Government officials, business people, the press and the man on the street—that Canada's war efforts thus far have been disappointingly meager, considering the necessities of the war situation.

C. D. HOWE, Minister of Munitions and Supply, who is "running the show" in Canada in the procurement of war materiel.

The press has not been sparing in its criticism of the delays which have bogged down Canada's preparations. For example *The Financial Post* of Toronto recently said:

"Canadian public opinion, in its protest against the complacency toward the war effort of a 'defense-sitting' government has almost exploded."

The Evening Citizen of Ottawa said last week:

"The Canadian people should be made aware that Canada is irrevocably in this total war wherever it may be waged. At present the battle front is on the other side of the Atlantic Ocean. It is supposed to be Canada's immediate effort to keep the enemy on the other side of the ocean by getting into the firing line to the full extent of Canadian resources. It is deluding the Canadian people, however, to carry on Canada's part in the war as though it could be a limited liability."

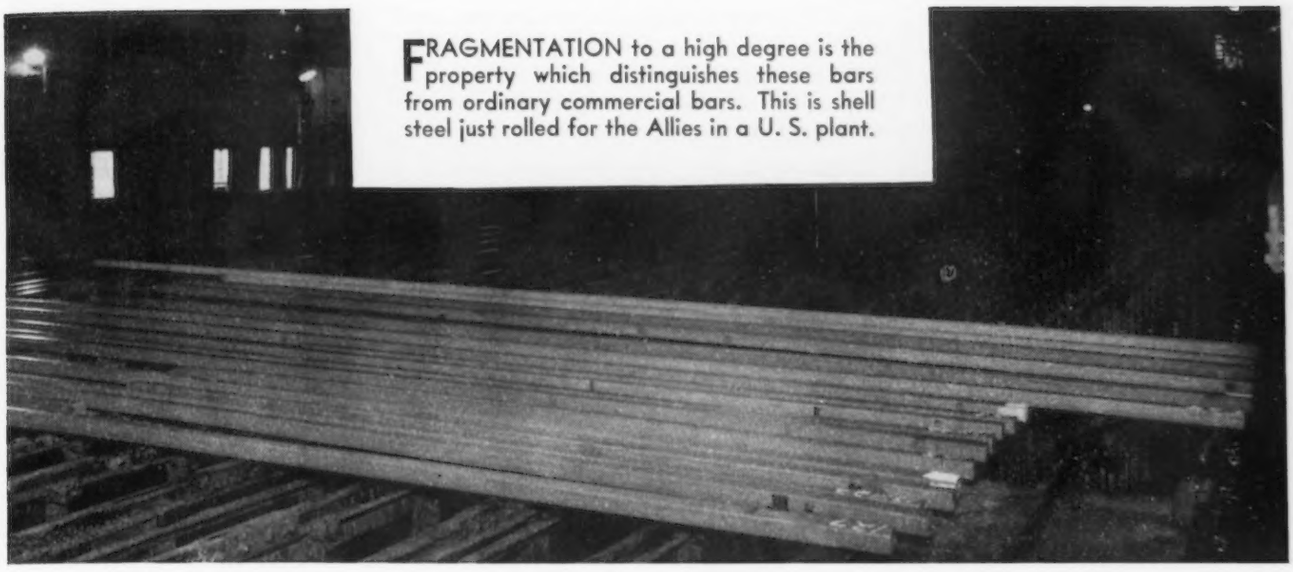
Canadian Government officials, however, plead extenuating circumstances, to explain the fact that progress in war preparations has been slow. In Parliament and elsewhere there has been a good deal of "buck passing" to the British. The British themselves apparently do not disclaim responsibility. A prominent British visitor to Canada, Lord Barnby, former president of the British Federation of Industries, in a statement to the Ottawa *Journal* said:

"Many who know Canada well feel it is most regrettable that Great Britain since the beginning of the war has not called on the industrial arsenals of the Dominion for far larger quantities of supplies."

The Canadian situation as it has developed thus far was explained to this writer by Government officials and prominent industrialists to be as follows:

When the Canadian Government declared itself in the war last September it immediately placed at the disposal of Great Britain its industrial and other resources for whatever help might be needed. Manufacturing executives rushed to Ottawa and in effect said, "What can we do?" In many instances they have not yet received the answer, but the remedy for this situation is now being applied and there will be a rapid mobilization of Canadian industry to make the Dominion's war effort more effective.

The Empire Air Training Plan was the most ambitious program in Canada. Canada's part was to supply air fields and instruction, Australia and New Zealand as well as Canada and Great Britain were to supply student fliers, the planes were to be built partly in



FRAGMENTATION to a high degree is the property which distinguishes these bars from ordinary commercial bars. This is shell steel just rolled for the Allies in a U. S. plant.

the Dominion, with the engines to be supplied largely by Great Britain. That greater progress has not been made is ascribed to the difficulty in obtaining sufficient training planes with the rapidity that is desired. The intensive war in the air, necessitating the use by Britain of all available planes and engines for the fighting front, has thrown Canada back on its own resources and those of the United States in carrying out this program from now on. A shipload of British airplane engines was turned around in mid-ocean a week or so ago on the decision of the Canadian Government that these engines would be of greater immediate usefulness in Britain and France than in Canada.

Canada has made progress in the building of airports for training pilots and has got fairly well along in the manufacture of airplanes, but will now have to turn to the United States for engines. J. S. Duncan, formerly vice-president of the Massey-Harris Co. of Toronto, agricultural machinery manufacturer, who was recently summoned to Ottawa to serve as Acting Deputy Minister of Defense in carrying out the aviation program, has made this statement:

"Immediate action is being taken to greatly increase Canadian aircraft industry, not only to take the place, where possible, of the machines which the United Kingdom was to have sent for the Air Training Plan, but to provide the mother country with an ever increasing number of fighter and bomber craft for active service.

"While maintaining the framework of the British Commonwealth Air Training Plan and proceeding with its development so that at the earliest possible moment it can be geared to capacity again, every effort is being directed toward the maximum output of pilots, air gunners and air observers in the shortest possible time for overseas service, and a steady flow of pilots, and subsequently of air crew generally, will proceed overseas monthly from now onward to join operational squadrons of the Royal Air Force."

In the first World War a considerable part—as much as 50 per cent at one time—of the shells used by the British were manufactured in Canada. Until the last few weeks there has been no such expenditure of shells in this war as occurred in the other war. Last fall Great Britain had huge stocks of shells, which were overflowing in all available storage space. Canadian manufacturers who had experience in shell manufacture prepared to get into that line of production again, but orders were slow in forthcoming. Canadian industry also offered its facilities for the manufacture of tanks and there were negotiations toward that end, but they got nowhere, chiefly through the failure, it is said, of the British to furnish the necessary contracts and specifications.

Canadian industries, which are geared up for production on the American pattern, were in a position to swing into a much more rapid war work if they had been permitted to work out their own designs, but it was necessary that mechanized equipment should be built according to British specifications so that there would be complete interchangeability of parts when the equipment was put into active service on the other side. The Canadian military units which will serve overseas will be part of the British Army and therefore the equipment with which they are supplied must be of a duplicate of that manufactured in Great Britain. While this does not apply to airplanes, it is still true of other mechanized equipment.

Now that the success of tank warfare has been so amply demonstrated by Germany, it is practically certain that the manufacture of heavy tanks will be begun in Canada as quickly as possible. Munitions Minister Howe told the Canadian House of Commons last week that a delegation of Canadian manufacturers would leave for Britain immediately to bring back plans and specifications for heavy tanks. THE IRON AGE was reliably informed that tanks as heavy as 80 tons would probably be made in Canada. No Canadian steel mill can turn out the armor plate required for such tanks, hence Canada will depend on American producers.

Canada's entire war effort is be-

ing revitalized by two factors, one being the dire need of the British for help, a need which did not seem to exist during the early months of the war, while the other is the amazing change in public sentiment toward the war which has occurred in the United States. It is apparently assumed in Canada that whatever help can be rendered by the United States and its industries will be forthcoming without red tape.

The lesson which Canada has learned from its war efforts thus far—a lesson that has also been bitterly learned in Great Britain and France—is that democratic countries are seriously handicapped as compared with the dictatorship countries.

Canada's position at the outset of the war was not unlike the situation that the United States now faces. The Dominion was divided by political factions; it held a national election in the midst of its initial war effort; the people were no more war-minded than is the majority in the United States today; the popular will (as the election showed) was against sending an army to Europe except on a voluntary basis, and even today there is no conscription in Canada.

Imports of Metal-Working Machinery Into Canada, April, 1940

Classification	United States	United Kingdom	Total All Countries
Drilling and boring machines	$89,904	$8,250	$106,074
Grinding machines	131,228	3,681	134,909
Lathes	214,534	11,255	228,639
Milling machines	75,398	9,930	92,613
Planers	23	127	150
Presses	129,085	.....	129,085
Rolling mill machines	130,038	47,109	177,147
Shapers and slotters	15,156	5,058	20,214
Not otherwise listed	352,031	10,495	369,450
Grand Totals	$1,137,397	$95,905	$1,258,281
March, 1940, Totals	916,498	54,548	979,752

Source: Dominion Bureau of Statistics.

Moreover, the turning over of industrial processes from a peacetime to a war-time basis was no easy task and has not even yet been accomplished to the degree that it probably will be in the next few months. Canada, like the United States, had no army ready to take the field in actual warfare. Its Government officials were not equipped to take over the vast job of turning industry into a war machine and they had to call upon industrial executives in all branches of business to supervise the technical tasks involved in industrial mobilization. There was a good deal of "trial and error" period. But today the staff of industrial experts has been recruited and assigned to jobs.

The man who is "running the show" in Canada in the procurement of war materiel is C. D. Howe, Minister of Munitions and Supply. He is an American by birth, an honor graduate of the Massachusetts Institute of Technology, who has lived and worked in Canada for 25 years. As an engineer he has designed and supervised the construction of most of the grain terminals in the Dominion.

In commenting on the staff of assistants he has recruited, Mr. Howe said that "Never in history has the Dominion had better business leadership in Government departments than today. The best business brains in the country are doing the country's business and in every sphere of the work of my department we have those who are trusted both by business and the public. They have been selected without any thought of their political affiliations."

Men prominent in the steel and metal-working industries in Canada are occupying important executive posts. The director of munitions is W. F. Drysdale, vice-president of Montreal Locomotive Works, who superintended the munition production facilities of the Steel Co. of Canada in the last war. D. B. Carswell, who heads the shipbuilding division, was managing director of Canadian Vickers for many years and during the last war directed a shipyard in the United States. The director of purchases is J. P. D. Malkin of Vancouver, who was one of the largest purchasers on the

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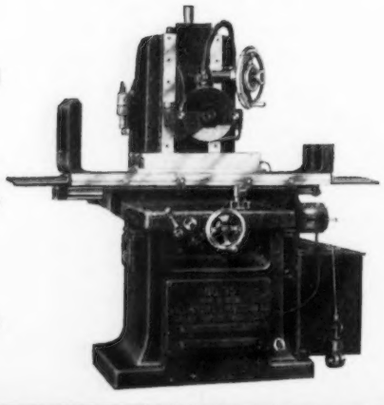

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GRAND RAPIDS MICHIGAN

Pacific Coast. In charge of all construction work is Denis Stairs, a Montreal engineer who is a director of the Montreal Engineering Co. C. W. Sherman, president of the Dominion Foundries & Steel, Ltd., of Hamilton, Ont., is one of the technical consultants.

At the head of the purchasing division of the Department of Munitions and Supply is John Eaton, assistant general purchasing agent of the Canadian Pacific Railway, and his assistant is W. D. Low, of the Canadian National purchasing department

There are ten divisions of the munitions department and each has employed men from industry who have had long experience in the particular type of buying they do whether it be clothing, machinery or steel.

The steel industry of Canada, while it is now working at maximum capacity, will be able to do much more in the more intensive war program now being inaugurated as steel now being used for other than war work can be diverted to war manufacturing purposes. Nevertheless there will be an increasingly large call on steel mills in the United States—for armor plate, for ship plates and for other products which, as in the case of heavy armor plate, Canadian industry cannot supply at all, or which, as is true of ship plates, are not produced in sufficient quantity in the Dominion for the shipbuilding program now being carried on.

(In the next issue an article will discuss how trade between Canada and the United States has been affected and is likely to be affected henceforth by war developments.)

350 Anti-Tank Gun Carriages Ordered

Chicago

• • • **The York Safe & Lock Co.,** York, Pa., has been awarded a contract by the Rock Island Arsenal for the manufacture of 350 carriages for 37 mm. anti-tank guns. Delivery was offered in 360 days and $2,370 per carriage was bid. Bids will be opened June 11 on 416 similar carriages.

Copper, Brass Groups Are Consolidated

• • • **The Copper and** Brass Mill Products Association and the Copper and Brass Research Association have been merged under the name of Copper and Brass Research Association, 420 Lexington Avenue, New York. T. E.Veltfort is manager and Bertram B. Caddle is secretary of the merged association.

Standards Bureau Offers Radiator Recommendation

• • • **Printed copies of** Simplified Practice Recommendation R174-40, large-tube cast-iron radiators, are now available, according to the Division of Simplified Practice, National Bureau of Standards. The recommendation gives the number of tubes, catalog rating per section and dimensions of 17 sizes of radiators and is the result of a study of demand for various sizes made by the Institute of Boiler and Radiator Manufacturers.

AFL Union Loses Vote In Illinois Tool Works

Washington

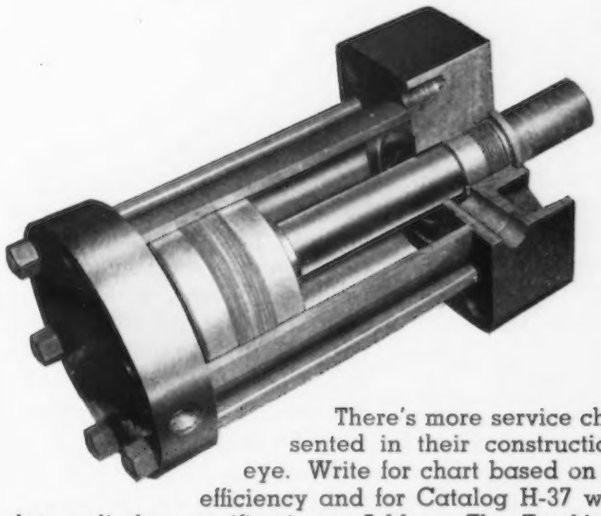
• • • **The National Labor** Relations Board on Monday announced dismissal without prejudice of a petition for investigation and certification of representatives of employees of Illinois Tool Works, Elgin, Ill., filed by AFL's Metal Trades Department. The board's action followed a secret ballot election.

Wage-Hour Ruling on Job Records Revised

• • • **The Labor Department's** wage and hour division has revised its former rules so that hereafter employers can maintain employment records required under the Fair Labor Standards act at a central record-keeping office on condition that the records shall be available at the place of employment within 72 hr.

one piece piston construction
unbroken cylinder performance

T-J HYDRAULIC CYLINDER



performance is a day in day out affair for good lengthy satisfactory periods. Their one piece piston construction requires no screws. This does away with the danger of cylinders damaged by the loosening of the piston assembly screws.

There's more service characteristics represented in their construction than meets the eye. Write for chart based on tests made of their efficiency and for Catalog H-37 which includes complete cylinder specifications. Address The Tomkins-Johnson Co., 628 N. Mechanic Street, Jackson, Michigan.

this is a **TOMKINS-JOHNSON** *product*

New Chairman of U. S. Steel Once Secretary to Mr. Justice Holmes

• • • **Irving Sands Olds,** who last week became chairman of U. S. Steel Corp., succeeding E. R. Stettinius, Jr., was born in Erie, Pa., in 1887. He was graduated from Erie High School in 1903, from Yale College in 1907, and Harvard Law School in 1910. He was admitted to the bar in Pennsylvania in 1910 and in New York in 1912.

Mr. Olds was secretary to Mr. Justice Holmes, of the United States Supreme Court, in 1910 and 1911, joining White & Case, the well-known New York legal firm, in 1911, and being admitted as a partner in 1917.

During 1917-1919, Mr. Olds served as counsel for the Purchasing Department of the British War Mission to United States, and in 1918 was a special assistant in the U. S. War Department. Since 1919, Mr. Olds, as a member of the firm of White & Case, has engaged in legal work related to matters of organization and administration of corporate business enterprises.

Mr. Olds is a member of the Council on Foreign Relations and Alpha Delta Phi Fraternity. His clubs are the Century, Knickerbocker, University, Yale, Downtown and Grolier.

IRVING S. OLDS, New York attorney, has been elected chairman of the board of United States Steel Corp.

Long Island Plane Signal Plant Moved to Dayton

Dayton

• • • **William P. Lear,** president of Dayton's new aviation industry, Lear Avia, Inc., was honored here recently when the Chamber of Commerce and its aeronautical committee, representatives of Wright Field, city officials and business men gathered at a reception intended as a civic welcome to the company and its personnel. One of the leading manufacturers of radio equipment and signal devices for airplanes and airports, the Lear Company was brought here in December from Mineola, Long Island, and located its plant at the Dayton Municipal Airport in Vandalia.

SWOC Seeks Dismissal Of Republic Steel Suit

Cleveland

• • • **A motion to dismiss** a suit for $7,500,000 brought by Republic Steel Corp. against the CIO, the SWOC, and several hundred individuals connected with the union as a result of the "Little Steel" strike in 1937 was filed in United States District Court, June 5, by Marvin C. Harrison, attorney for the defendants.

The motion cited a Supreme Court ruling that these laws could not be applied to a labor union where a strike was not shown "to have any actual or intended effect on price or price competition."

Rock Island Company Orders $100,000 Expansion

Chicago

• • • **The Birtman Electric** Co., Rock Island, Ill., manufacturers of washing machines and other household appliances, has awarded a contract for the design and construction of a 35,000 sq. ft. addition to its Rock Island plant, to the Austin Co., Cleveland. The expansion program involves more than $100,000 and includes a new plating room, a new punch press department, an addition to the machine shop, and additional foundry and warehouse space.

Allegheny Ludlum Expands Stainless Wire Capacity

Pittsburgh

• • • **For the fourth** time Allegheny Ludlum Steel Corp. is doubling its stainless wire capacity, and when construction of the new building which will house the latest stainless steel wire mill at the company's Dunkirk, N. Y., plant is completed, it will represent the third time that additional buildings have been erected to provide for the rapidly increasing demands, according to W. F. Detwiler, Allegheny Ludlum chairman.

Abrasive Groups Holding Meetings at Niagara Falls

• • • **Members of** the Grinding Wheel Manufacturers Association and the Abrasive Grain Association met June 5-6-7 at Niagara Falls, N. Y., where addresses by Dr. W. Irving Clark and Whiting Williams, industrial relations counsel, were heard.

All Welded Cargo Ship Launched at Pascagoula

Birmingham

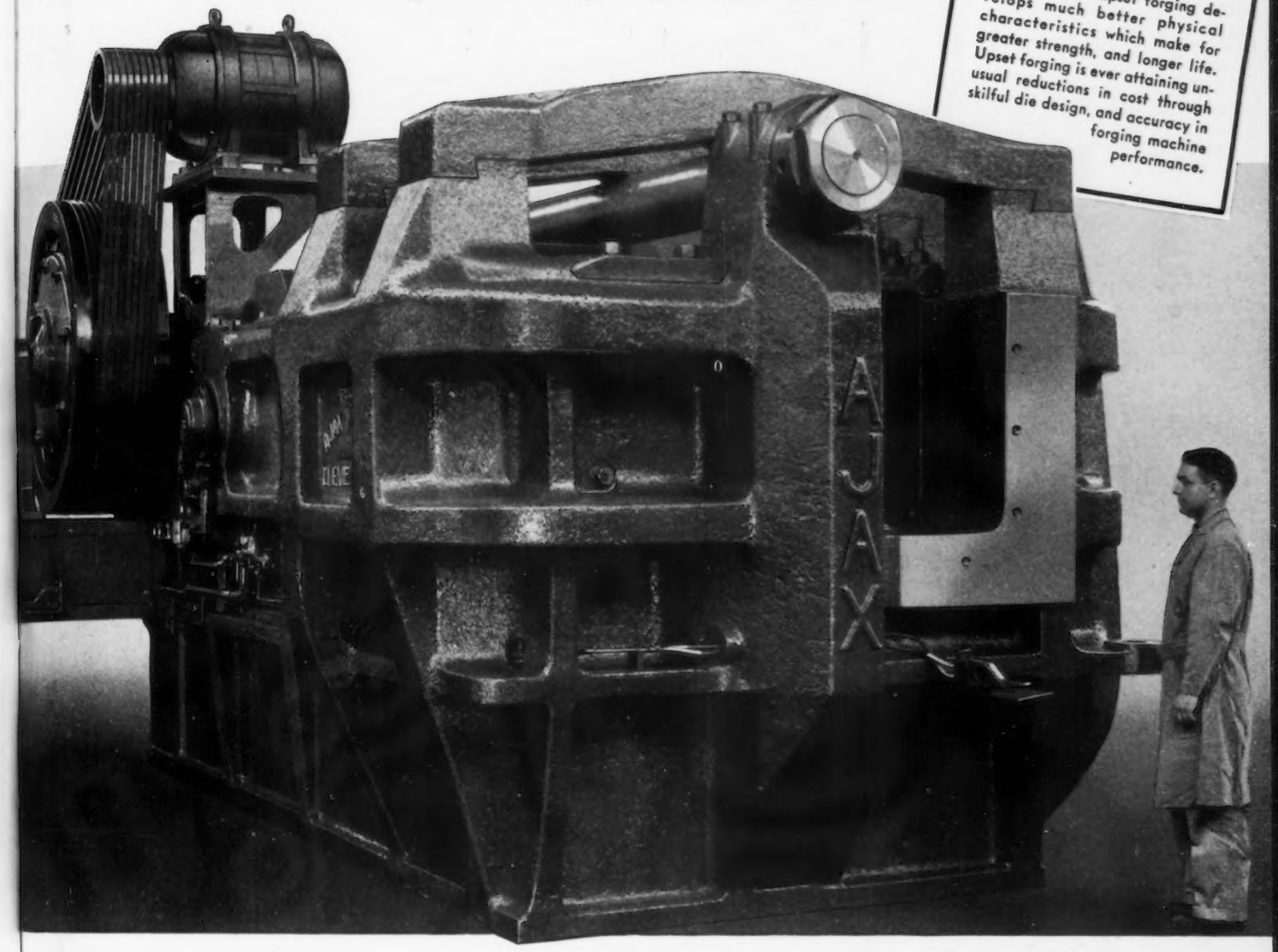
• • • **The first all welded** cargo ship to be built in the South was launched at Pascagoula, Miss., on June 8. The ship was the S. S. Exchequer, built for the American Export line by the Ingalls Shipbuilding Co., of which Monroe B. Lanier is president.

Yields of 90% to 99% forged product from steel used, obtained with AJAX air-clutch forging machines, puts high penalty on use of obsolete upset forging equipment

UPSET FORGING

OFFERS SUBSTANTIAL SAVINGS IN STEEL, MACHINING, FREIGHT

In many cases, upset forging develops much better physical characteristics which make for greater strength, and longer life. Upset forging is ever attaining unusual reductions in cost through skilful die design, and accuracy in forging machine performance.



YIELDS were realized on extensive variety of parts, in forging of which savings of steel ranged from 10 ounces to 22 pounds per forging. Extreme frame rigidity, accuracy of die alignment, and elimination of flash enables Ajax Forging Machines to produce forgings to a uniformity of dimensions limited practically only by the accuracy to which dies can be maintained on production work. On many forgings the machining allowances are little more than is required for removing the decarburized skin.

Smooth, cushioned starting at high speed and instant response to effortless tripping make possible increased production on all types of upset forgings, and completion of many multi-operation forgings at a single heat, which would otherwise require re-heating. Close tolerances and speedier production in a degree usually considered unattainable are obtainable by using Ajax Air-Clutch Forging Machines. Write for Bulletin No. 65-A.

THE AJAX MANUFACTURING COMPANY

621 MARQUETTE BLDG. CHICAGO, ILLINOIS

EUCLID BRANCH P.O. CLEVELAND, OHIO

201 DEWART BUILDING NEW LONDON, CONN.

SAVINGS START IN TWO MINUTES

That's all the time it takes to Hang Up and Plug In a "Budgit" Hoist — Then it's ready to use and all the advantages of electric lifting are yours . . . "Budgits" speed the work, promote efficiency, reduce waiting time of men and machines 20 to 40% and more . . . ***They Earn Their Low Cost Over and Over Again Out of Savings.***

"Budgit" Hoists come in 250, 500, 1000, and 2000 pounds lifting capacity with speeds to suit today's tempo . . . All weigh so little you can move them from job to job.

You can afford "Budgits"! Prices start at $119. Nothing else to buy before you can use them. You simply Hang Up, Plug into the nearest electric socket, and Use!

Send for catalog containing complete information, also "Time Savings Calculator" that shows savings they earn.

SHAW-BOX CRANE & HOIST DIV.
MANNING, MAXWELL & MOORE, INC.
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Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists . . . Send your crane and hoist inquiries to "Shaw-Box"!

Portable Electric **BUDGIT** *HOISTS*

Stettinius, Knudsen Fill Out Staffs To Speed National Defense Program

Washington

• • • **The National Defense** Advisory Commission, biting deeper into its White House assignment of coordinating industrial defense efforts, can be expected to be in a position soon to "test its wings" and measure the scope of its authority.

Its authority is still the subject of some discussion. Even those who adhere to the belief that at least some members of the commission would not have accepted membership without first being assured of what power was vested in them found it difficult to reconcile President Roosevelt's statement that the commission had complete authority when the National Defense Act of 1916, under which the agency was created, refers to its function as purely advisory.

The commission conferred for the second time with President Roosevelt at the White House last Thursday, at which time Eward R. Stettinius, Jr., commission member in charge of raw materials, was named to head a special committee to study greater consolidation of government purchasing. Assisting Mr. Stettinius in this job will be Rear Admiral Ray Spear, Navy Department; Brig. Gen. C. T. Harris, assistant chief of ordnance, War Department, and Donald Nelson, resigned president of Sears Roebuck & Co., who was recently designated by the White House as director of procurement for the Treasury Department. The President has directed that this committee make a report with recommendations as soon as possible.

Mr. Stettinius, the President announced on Friday, has submitted a preliminary report on the subject of acquiring stocks of strategic materials. He added that the necessary plans are progressing rapidly. The President, without elaborating, described the situation as well in hand and referred specifically in this connection to tin, manganese and rubber over which he implied there has been an unjustified atmosphere of hysteria.

Although the President made no mention of it, other administration officials were understood to be developing plans for acquiring critical war materials from sources outside this country through a barter system of disposing of surplus United States farm products. Although legislation would be necessary to execute the plan, Federal Loan Administrator Jesse Jones was reported to have assured members of Congress that approval would mean that the Reconstruction Finance Corp. would use raw or manufactured agricultural products to pay almost wholly for reserve defense supplies purchased abroad.

Both War and Navy Departments have been instructed by the White House to consult William S. Knudsen, member of the commission in charge of production, on the placing of all contracts. Apparently taking a page out of World War experience when the lack of coordinated buying program contributed to delay and confusion in the early days, Mr. Roosevelt said that the objective would be to place orders where Army and Navy surveys show they could be handled best and most expeditiously. The growing tendency appeared to be in the direction of consolidating more purchasing in the Treasury's Procurement Division under Mr. Nelson. That division has heretofore been the centralized purchasing agent for Federal agencies except for the requirements of War and Navy Departments and a few other independent establishments.

Meanwhile John D. Biggers, president of the Libby-Owens-Ford Glass Co., and former director of the 1938 unemployment census, has been named as Mr. Knudsen's executive assistant. Also added to Mr. Knudsen's staff were:

H. B. Vance, chairman of the board, Studebaker Corp., South Bend, Ind., in charge of the machine tool section.

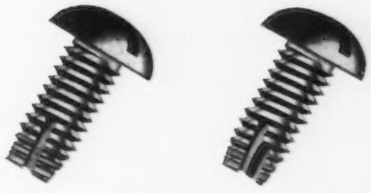
George J. Mead, former vice-president of the United Aircraft Corp., Hartford, who will direct the aeronautical section.

E. F. Johnson, former General Motors executive, to assist on ordnance problems.

Mr. Stettinius appointed an additional assistant, Thomas B. McCabe, president of Scott Paper Co.,

SHAKEPROOF *Thread-Cutting Screws*

● It's no longer necessary to go to unorthodox threads to eliminate tapping costs. Shakeproof Thread-Cutting Screws use a standard machine screw thread which provides the ideal engagement with the work. And, because each screw actually cuts its own threads in any thickness of material, a snug, tight fit is always certain. Here's economy, plus greater fastening efficiency—a proven means for protecting product performance and reducing costs!



Type 1 for metals Type 2 for plastics

SHAKEPROOF LOCK WASHER CO.

Distributor of Shakeproof Products Manufactured by ILLINOIS TOOL WORKS

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Shakeproof Screw products are available with Phillips Recessed Heads.

A test in your own shop will convince you that Shakeproof Thread-Cutting Screws offer definite cost-saving possibilities in countless metal or plastic fastening applications. Write for free testing samples now!

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"PLATING RACKS STILL PERFECT AFTER 6 MONTHS' SERVICE"

WRITES

UNICHROME* RACK COATING-W

USER

READ THIS ENTHUSIASTIC REPORT BELOW

You want to save money by getting longer life from your plating rack coating. So read what this user of "Unichrome" Rack Coating-W says:

"One set of racks coated with your Rack Coating-W is in use in the cleaning and bright nickel cycle; the other in cleaning and chromium plating. They're still in perfect condition (after 6 months' service). It's the best material on the market."

From many other letters in our files come comment after comment—like "the finest material we've come across." For in "Unichrome" Rack Coating-W users find a coating material with a *combination* of advantages found in no other rack insulation . . .

1. Not affected by boiling cleaners or plating solutions
2. Does not blister or crack
3. Tough—withstands wear and tear of normal handling
4. Contains no ingredient harmful to any plating solution
5. Cuts costs—by greatly reducing frequency of recoatings
6. Easy to apply—by "dip and force dry" method
7. White in color—easy to see how completely the rack is covered
8. Any part of rack can be recoated without necessity of recoating entire rack

Write for Bulletin No. 15
Containing complete information

Platers without rack dipping and drying facilities may have their racks coated with "Unichrome" Rack Coating-W making arrangements with Chromium Corporatioin of America, 4645 West Chicago Avenue, Chicago, Illinois; Lea Manufacturing Company, Waterbury, Conn., or Belke Mfg. Company, 747 N. Cicero Avenue, Chicago, Illinois.

UNITED CHROMIUM
INCORPORATED

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and board chairman of the Philadelphia Federal Reserve Bank.

Also reportedly turned over to the Advisory Commission when members met earlier in the week with representatives of the Army was a voluminous survey of strategic sites for new armament plants in inland areas.

While members of the commission went ahead with their assignments on the assumption that they are being given full responsibilities, it was expected that the adaptation of their industrial techniques to the job will be a testing ground for learning just how far their authority extends. Secretary of the Treasury Morgenthau definitely has retired from the spotlight by relinquishing his job of coordinating aircraft and machine tool expansion in favor of Mr. Knudsen, but Secretary of Commerce Harry L. Hopkins and William H. McReynolds, White House executive assistant, continue to play the part of key advisers to Mr. Roosevelt on the defense program.

Mr. McReynolds, designated secretary of the advisory commission, comes closer to being the chairman of the group. In fact Mr. Roosevelt has referred indirectly to Mr. McReynolds' function as comparable to that of chairman. Mr. Hopkins, who has slept in the White House ever since Germany invaded the Low Countries, still is consulted repeatedly as administration liaison between the administration and business.

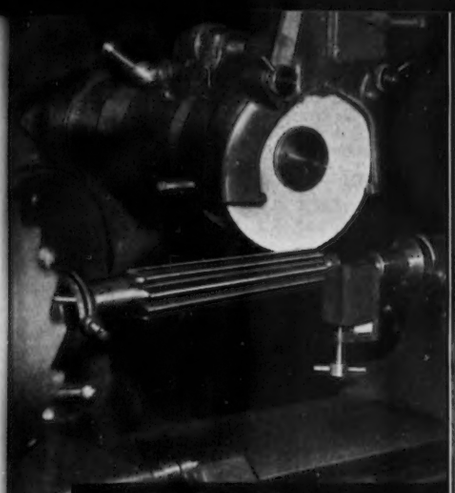
At his press conference early last week, Mr. Roosevelt was critical of stories which he said had been written to the effect that Government advisers and not industry representatives were the guiding lights for the defense program. The President categorically denied such reports; insisting that Secretary Morgenthau's assignment on aircraft and machine tool expansion was only a temporary arrangement with the intention from the start being to turn the job over to industry executives.

IF GERMANY WINS the war, women workers like those above will have had an important part in making the tools of war. The two women in this picture are placing fuses in hand grenades in a German ammunition factory.

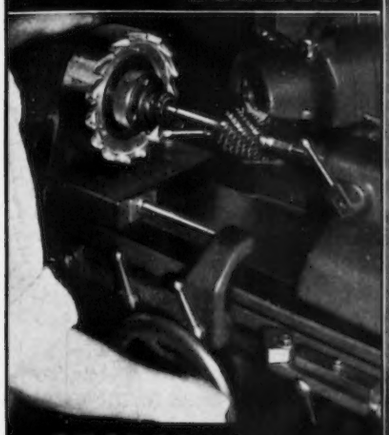
Other developments in the defense picture included:

1. An expectation on Capitol Hill that the President, cognizant that the defense tax bill is the greatest hazard to early adjournment, will take active steps to effect congressional adjournment by June 22, two days before the opening of the Republican National Convention in Philadelphia.

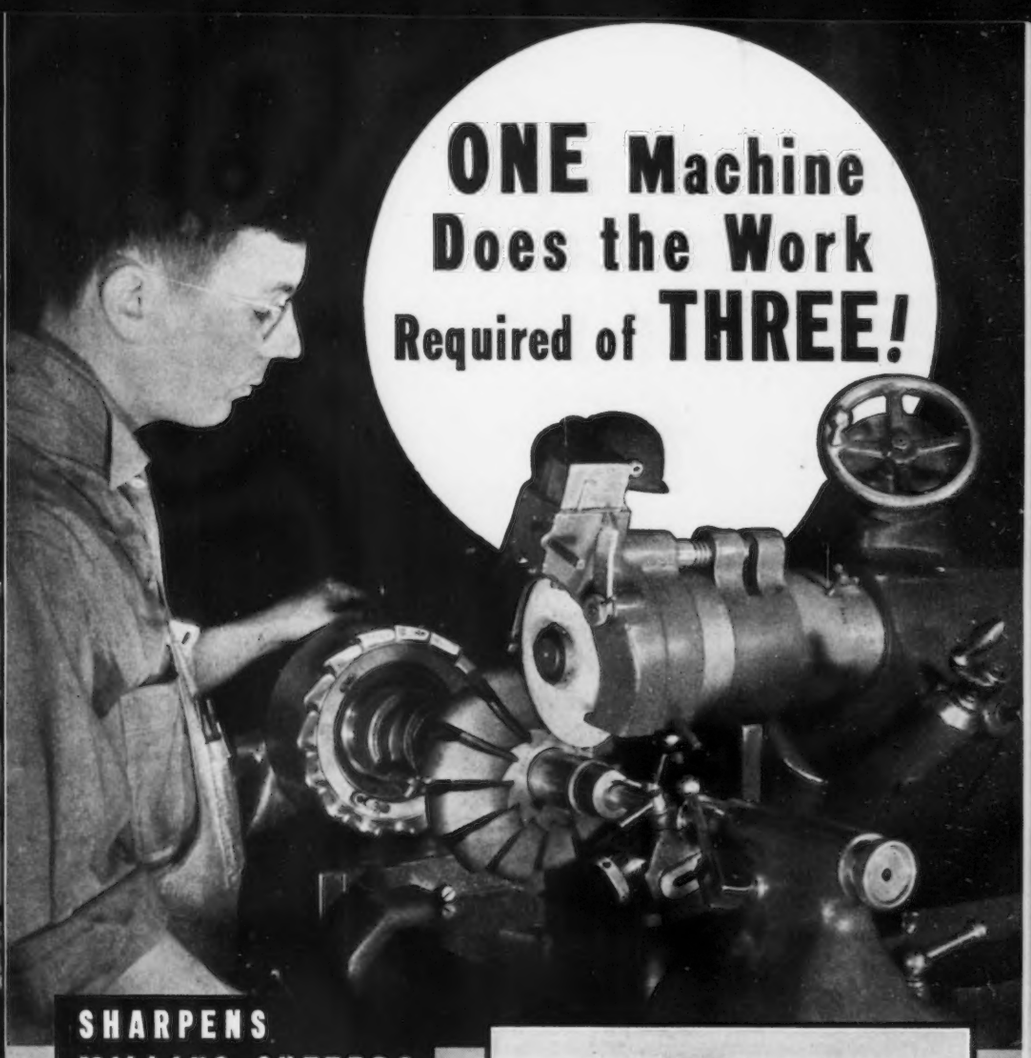
2. An attempt by Secretary of Labor Francis Perkins to maintain harmonious labor relations in the face of the defense program by



SHARPENS REAMERS



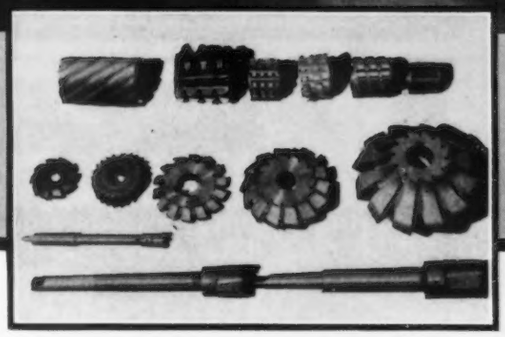
SHARPENS HOBS



ONE Machine Does the Work Required of THREE!

SHARPENS MILLING CUTTERS

BARBER-COLMAN COMBINATION SHARPENING MACHINE Is Tops For Accuracy . . .



This versatile machine provides an economical method for sharpening hobs, milling cutters, and reamers. It is designed for the small or average size shop where this work appears in small quantities. The average cutter or hob may be resharpened in 15 to 20 minutes and the machine economically justifies itself in shops having a minimum of 6 hours of this work a day.

Cutting tools may be resharpened with precision accuracy. The machine is very easy to set-up and to change from one job to another. Positive mechanical control assures the duplication of original tool efficiency which has far reaching effects such as economy of long tool life, maximum number of pieces per grind, accurately finished parts, and the reduction of spoiled work.

A Barber-Colman representative will be glad to tell you more about this machine and its use on your work. Will you ask him to call?

BARBER B-C COLMAN

PRODUCTS

MILLING CUTTERS, HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, SPECIAL TOOLS

For example, the illustration above shows a typical group of cutting tools used by a manufacturer of power transmission equipment. They include hobs, spiral cutters, and reamers — all of which are sharpened on their Barber-Colman Combination Sharpening Machine.

The operator said, "The tools now stand up longer because they are sharpened right."

Write today for your copy of Barber-Colman Bulletin 1486, which fully describes and illustrates advantages of the Combination Sharpening Machine for reamers, hobs, milling cutters. It contains 29 illustrations of distinctive features and typical set-ups.

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Write for data sheets giving compositions, physical properties, heat-treating guide and applications of our complete line. Keep them handy for reference and be prepared when you need steel in a hurry. Our seven convenient warehouses assure prompt deliveries.

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Send us your problems on Compression Springs

We may suggest:

* An open end where space is limited.
* Closed ends to avoid tangling and speed up assembly time.
* Ground ends where necessary to stand squarely and compress uniformly.
* Removing set if highly stressed when at work.
* Allowing for set if compressed solid when assembling.
* Kind of material and finish.

"We don't know all about springs
BUT
All we do know is about springs"

Tell us the working length, with load spring is to carry at given length. Better still, send us the part in which the spring goes.

Dunbar Bros. Co.

DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT
"Quality Springs Since 1845"

selecting seven representatives in the department's conciliation service to maintain a special watch over labor relations in important industries essential to the national defense.

3. Action by the House Appropriations Committee to hasten consideration of a Presidential request for a $6,558,800 appropriation for the use of the Justice Department's Federal Bureau of Investigation and its newly-acquired Bureau of Investigation and Naturalization—a step in furtherance of an ostensible intention to give the FBI broader policing powers to counteract threats of espionage and sabotage in private plants and elsewhere.

4. Tentative approval by a House Ways and Means sub-committee of increase corporate and personal income taxes to boost the yield of the new national defense revenue bill to more than $1,000,000,000.

5. An interpretation by Solicitor General Francis Biddle that transfer of obsolescent Army and Navy aircraft to the Allies by turning the ships back to the manufacturers in trade for newer models involved no violation of existing neutrality laws.

Four Aircraft Companies Organized in California

Los Angeles

• • • Four aircraft company incorporations were filed in southern California last week. The firms are the Long Beach Aircraft Corp., capital stock $100,000; Argonaut Aircraft Corp., capital stock $1,000,000; Los Angeles Aircraft Corp., capital stock $25,000; and Manta Aircraft Corp., capital stock 100,000 shares, no par.

Court Rules WPA Wages Cannot Be Garnisheed

Milwaukee

• • • **The wages of a WPA** worker cannot be garnisheed, according to a finding of a local civil court judge, who based the decision on an old supreme court ruling. It was pointed out that using relief funds to pay judgments of this kind was illegal and that such funds belonged to the government up to the moment it is handed over to the recipient.

Graduation Exercises Held For Shop Training Students

Cleveland

• • • **Elaborate graduation** exercises were held here June 7 for students completing a shop training course of Thompson Products, Inc., maker of aircraft and automobile valves and parts. Tell Berna, secretary, National Machine Tool Builders Association, was principal speaker.

Twelve young men who passed the four-year course of training received diplomas and bonuses of $100 each. The bonuses were in addition to the pay received through the training course, which runs from 30c. an hour for the first year to 55c. an hour for the fourth. Subjects taught include shop practice, shop mathematics, mechanical drawing, tool and machine design, chemistry, metallurgy, electricity and business administration. Members of the class entered as high school graduates with technical training. The company issued a printed graduation program.

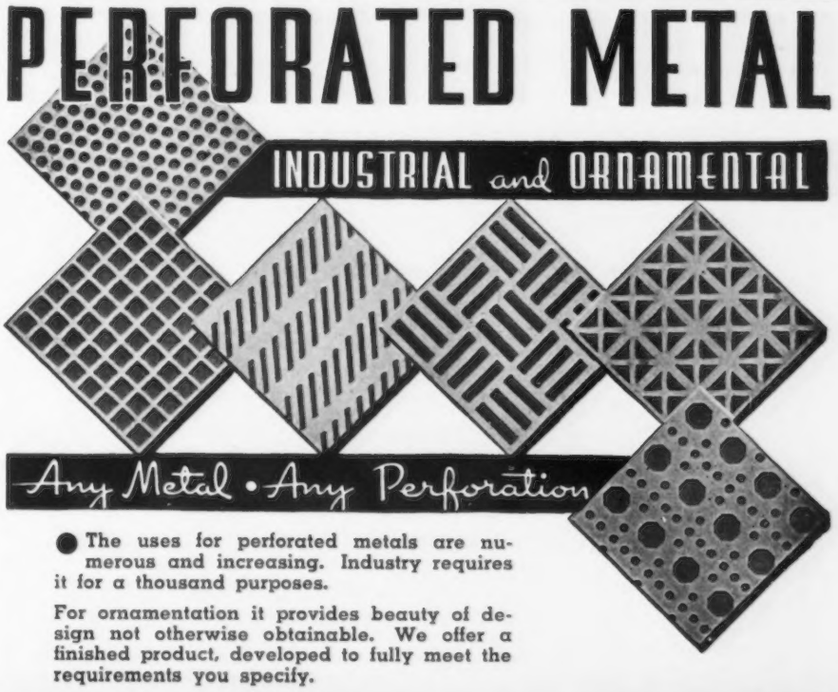
Lockheed Sales Are 114% Ahead of Last Year

• • • **Lockheed Aircraft Corp.** for the four-months' period ended April 30, last, had net sales amounting to $12,556,846, as compared with $5,867,777 for the corresponding period in 1939, according to Robert E. Gross, president. The increase in dollar volume of output is approximately 114 per cent over the first four months of last year. Deliveries of airplanes for the period showed a 70 per cent increase over the first four months of 1939.

Enameling Furnace Sold to Subsidiary of Mullins

• • • **Ferro Enamel Corp.**, Cleveland, has sold a large oil-fired "straight-through" type continuous porcelain enameling furnace with full Alundum muffle to the Youngstown Pressed Steel Division of the Mullins Mfg. Co., for their Warren, Ohio, plant. A new building will house the furnace. Installation will be under way by mid-summer. The new furnace will be utilized for the production of pressed steel plumbing-ware as well as other products made by the company.

HILLSIDE FLUORSPAR
85% AND OVER IN CALCIUM FLUORIDE
DOES NOT EXCEED 5% IN SILICA · FREE FROM SULPHIDES, LEAD AND ZINC
Steel Manufacturers Standard Specifications
Shipments from stock Rail or River
HILLSIDE FLUOR SPAR MINES
38 SOUTH DEARBORN STREET
CHICAGO, ILL.
MINES IN ILLINOIS AND KENTUCKY



● The uses for perforated metals are numerous and increasing. Industry requires it for a thousand purposes.

For ornamentation it provides beauty of design not otherwise obtainable. We offer a finished product, developed to fully meet the requirements you specify.

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● Shaft 57 feet long, largest diameter 11¾ inches, weight 17,300 pounds — forged and rough machined by Standard Steel Works Company.

STANDARD is equipped to produce steel forgings and castings of any size and shape to suit your requirements. • • • The steel used in Standard's forgings and castings is acid open hearth, produced in our own furnaces under close metallurgical control.

CASTINGS • FORGINGS • WELDLESS RINGS • WROUGHT STEEL WHEELS

STANDARD STEEL WORKS

Division of THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

BLW THE BALDWIN GROUP

War Will Revive Thrift In U. S., Willys Head Says

Toledo

• • • **Americans will bring** thrift back into their way of life as a result of the European war, in the belief of Joseph W. Frazer, president, Willys-Overland Motors, Inc., who addressed a large gathering of business men here recently.

"National defense will cost money and we will have to pay for it," he said. "For the last few years thrift has seemed to lose its respectability but that day is fast drawing to a close. Our taxes have been high but they are bound to be higher. We are going to get back into the ways of thrift through sheer necessity."

Arsenals Go on 3-Turn Day and 6-Day Week

Washington

• • • The 11 U. S. arsenals have been placed on a six-day, three-shift basis as a means of speeding up production, according to an order by Maj. Gen. C. M. Wesson, the Army's chief of ordnance.

↓ ↓

Chicago

Shop workers at the Rock Island, Ill., arsenal, now employing nearly 5000 persons, will be paid time and a half for an extra eight hours' work on Saturdays, bringing their work week to 48 hr. with 52 hr. pay, following orders from Washington. The force may reach 15,000, the figure at the close of the World War, within 18 months.

U. S. Awards Contracts For Reconditioning Ships

Washington

• • • **The Maritime Commission** has awarded a contract to the Brewer Drydock & Repair Co., Staten Island, N. Y., for reconditioning of the steamship Waukegan for $55,229. The Maryland Drydock Co., Baltimore, was the low bidder at $77,777 for the reconditioning of the ship West Honaker. Eight other vessels are to be reconditioned. Bids for reconditioning of three of them will be opened June 14 at New Orleans. The date of opening bids for reconditioning of the remaining five has not yet been announced.

Resolution Would Enable President To Award Machine Tool Contracts

Washington

• • • **Expanding a provision** in the Vinson House bill to expedite ship construction, Senator Walsh, Democrat of Massachusetts, chairman of the Senate Naval Affairs Committee, on Monday introduced a joint resolution authorizing the President, through the Secretary of War or the Secretary of the Navy, to negotiate contracts for machine tools and similar equipment, deliveries to take priority over deliveries to be made by the contractor for use outside the United States. The resolution also specifically provides that the Walsh-Healey Public Contracts Act shall apply to such orders. The application of the Vinson bill, which passed the House last week, was limited to negotiated naval contracts. The House voted down the substance of the provision in the resolution calling for application of the Walsh-Healey act to contracts.

While there was doubt on the subject it was the general opinion that the House bill as passed suspended the Walsh-Healey act. The Vinson bill provides for negotiated contracts during any national emergency for the acquisition, construction, repair or alteration of naval vessels or aircraft, together with their spare parts and equipment, also machine tools.

Representative Healey, Democrat of Massachusetts, unsuccessfully offered an amendment to the Vinson bill providing that contracts negotiated by the Secretary of the Navy shall not be "deemed contracts" for the purchase of material in open market within the meaning of Sec. 9 of the Walsh-Healey act. This section suspends the Walsh-Healey act which establishes a standard 40 hr. work week with time and one-half for overtime. Wages under the act are prescribed by the Secretary of Labor. The Vinson bill fixes 48 hr. as the maximum work week.

Organized labor protested elimination of the Healey amendment from the Vinson bill and is said to be responsible for the Walsh resolution which was introduced after receiving approval of the Senate Naval Affairs Committee.

Meanwhile the Senate Committee at executive sessions on Monday and Tuesday considered the Vinson bill to expedite ship construction and is expected to report it out soon with the negotiated contract section as it applies to shipbuilding, supplemented with the provision of the Walsh resolution specifically applying the Walsh-Healey act to contracts.

Early action also is expected in the Senate on the May-Sheppard bill which gives the President power to embargo or curtail export shipments "of any military equipment or munitions, or component parts thereof, or machinery, tools, or material necessary for the manufacture or servicing thereof." The bill has passed the House.

British Order 300 Tanks in Canada

Toronto

• • • **An order has been placed** by the British Government for the construction of 300 tanks of the "Mark III Valentine" type, and preparations toward assembling raw materials are proceeding with the intention of starting work immediately, according to announcement by C. D. Howe, Minister of Munitions and Supply. The announcement was made following a meeting of officers of the Department of Munitions and Supply, the British Supply Board and the following representatives of Canadian industry on June 7. William Harty and William Casey of the Canadian Locomotive Co., Kingston, Ont.; R. B. McColl, Montreal Locomotive Works, Montreal; H. B. Bowen, chief of motive power, Canadian Pacific Railway; W. G. Turnbull, Turnbull Elevator Co., Ltd., Toronto, and C. W. Sherman, who in addition to representing

CHARLES E. WILSON (right), has been named acting president of General Motors Corp. to carry on the duties of William S. Knudsen, who has taken a leave of absence to direct production phases of the national defense program. At the left is his friend, Charles E. Wilson, president of General Electric Co. (The men have the same names but are not related.)

Dominion Foundries & Steel, Ltd., Hamilton, is the technical adviser on steel matters to the Department of Munitions and Supply.

The meeting was called to discuss the production of tanks in Canada. The industrialists who attended the meeting expressed their conviction that tanks of the most modern type could be produced in Canada.

While no details regarding plants that would be called upon to produce the tanks were made available, it is understood that construction work will be handled in the various locomotive and car building works in Ontario and Quebec. These plants are said to be almost completely equipped to handle this type of work. The particular tank type to be constructed here is a 40-ton tank with armored steel more than 4 in. thick. As no steel of this thickness is made in Canada, it will have to be supplied either from Great Britain or from the United States.

The Department of Munitions and Supply, Ottawa, last week broke all existing Canadian purchasing records by awarding 1089 contracts of total value of $11,872,710. Two United States companies were included in the list of recipients of war orders during the week. Among the more important contracts placed were:

Mechanical Transport—Pierre Thibault, Pierreville, Que., $5,184; Scythes & Co., Ltd., Montreal, $19,563; Canadian National Railway Co., Montreal, $10,300; General Motors Products of Canada, Ltd., Oshawa, $4,400,294; Ford Motor Co. of Canada, Ltd., Windsor, Ont., $4,648,437; Thew Shovel Co., Lorain, Ohio, $20,313.

Aircraft Supplies—Canadian Pratt & Whitney Aircraft, Ltd., Longueuil, Que., $564,891; Walter Kidde & Co. of Canada, Montreal, $48,130; Noorduyn Aviation, Ltd., Montreal, $47,403; Canadian Vickers, Ltd., Montreal, $31,585; C. O. 2 Co. of Canada, Toronto, $148,303; La France Fire Engine Foamite, Ltd., Toronto, $85,308; Pyrene Mfg. Co., Ltd., Toronto, $46,950; Wells Air Harbor, Vancouver, B. C., $7,112.

Machinery and Tools—Stanley Tool Co. of Canada, Ltd., Roxton Pond, Que., $12,200; Builders Sales, Ltd., Ottawa, $10,398.

Ordnance—Accessories Mfgrs., Ltd., Montreal, $7,008; Auto Ordnance Corp., New York, $35,462; Colts Patent Firearms Mfg. Co., Hartford, Conn., $45,331; British Air Ministry, $47,034 and British War Office, $13,670.

Of the total value of the contracts placed by the Department of Munitions and Supply, Ottawa, and its predecessors, since July 14, last, less than 3 per cent was placed in the United States. Of total contracts amounting to over $193,000,000 placed up to the end of April, $5,500,000 were placed in the United States.

Watson for Peace, So Returns Hitler Medal

THOMAS J. WATSON, president, International Business Machines Corp., has returned the Merit Cross of the German Eagle, with star, conferred upon him in 1937 by Adolph Hitler in recognition of his efforts for world peace and world trade. In a letter to the German leader, Mr. Watson last week wrote: "In view of the present policies of your Government, which are contrary to the causes for which I have been working and for which I received the decoration, I am returning it."

Factory Sale of Cars, Trucks For May 404,700 Units

Detroit

• • • **Factory sale of** passenger cars and trucks totaled 404,700 units in May, it was estimated Monday by the Automobile Manufacturers Association. The May production raised the total for the first five months of 1940 to 2,168,178 units, 25 per cent higher than the corresponding period of 1939. Last month's total was 11 per cent under April, 1940, but 29 per cent above May of 1939. Factory sales for the five-month period this year were exceeded in 1929 and 1937.

New passenger car registrations slumped about 7 per cent in May from the April level, according to preliminary tabulations by R. L. Polk and Co. Reports from 107 metropolitan centers for the first 26 days form the basis for the estimates.

Workers to Get Full Pay For Military Service

St. Louis

• • • **Employees of** Monsanto Chemical Co., St. Louis, who are members of the National Guard, will be permitted to devote three weeks to training with their units this summer without loss of pay, according to instructions issued Saturday to the thirteen American plants of this company. Monsanto employees who are entitled to two weeks' vacation with pay and are members of the National Guard will be permitted to take their vacations at the time their guard units are to train. Upon request by these employees, a third week's leave of absence will be granted, Monsanto to make up the difference between the employee's pay and allowance for military duty and the amount he would receive from the company for a normal work week.

His Chief Product is Trouble for Adolph, Inc.

• • • **An unnamed engineer** in the Ordnance Department of the United States Army this week examined the following question on a form sent him by THE IRON AGE:

"What are the principal products manufactured at your plant?" The engineer then filled out in longhand and mailed this reply:

"Trouble for Adolph, Inc."

Naval Outlay Measure Is Signed by President

Washington

• • • **The $1,492,000,000** naval appropriation bill, providing funds for construction of two battleships, one aircraft carrier, two cruisers, eight destroyers, four submarines and five auxiliary ships, was signed this week by President Roosevelt after having passed the Senate without debate and without a record vote.

Chicago Traffic Club Celebrates Rail Anniversary

Chicago

• • • **Many representatives** of the railroad and steel industries helped the Traffic Club of Chicago celebrate the 75th anniversary of the rolling of the first steel rail in the United States at a luncheon here Monday. This event dated back to 1865 when the American Iron and Steel Association, meeting in Chicago, was shown a sample rail rolled (at the North Chicago Rolling Mill Co.) from a hammered bloom of bessemer steel which was also the first bessemer steel to be produced in the United States.

Development of the steel rail as far as the steel industry is concerned was traced from the time the railroads ran on wooden tracks up to the giant 152-lb. rail of today by Clarence B. Randall, vice-president, Inland Steel Co.

Effect of development of the steel rail upon railroads themselves from the standpoint of rolling stock, higher speeds and heavier equipment, was outlined by Ralph Budd, president, Burlington Road and President Roosevelt's appointee in charge of transportation on the recently organized National Defense Council. Mr. Budd gave full credit to metallurgy for the development of the rail and the accompanying progress that has been experienced by the transportation industry in general.

A United States Steel Corp. moving picture, which showed the manufacture of rails, wheels and axles, was presented by G. Cook Kimball, executive vice-president of the corporation.

Koppers Given Contract By White Tar Co.

Pittsburgh

• • • **Koppers Co.,** engineering and construction division, has been awarded a contract by the White Tar Co. of New Jersey, Inc., for the design and erection of modern naphthalene refining and disinfectant equipment.

Detroit Aircraft Parts Company Expands

Detroit

• • • **Machine & Grinding** Co., Detroit, has changed its name to Aeronautical Products, Inc., and is expanding operations at 18102 Ryan Road to handle an enlarged volume of aircraft parts and other precision work. Alfred Jackson, (top photo) has been named president and general manager. Charles C. Layman (below) is vice-president and sales manager. Macauley Whitfield is secretary, Byron M. Layman, treasurer. A. C. Brietenbeck, formerly chief inspector of Vickers, Inc., Detroit, has been named chief inspector.

Quantity Output Of Stainless Steel Planes Forecast

Pittsburgh

• • • **Large scale production** of all-stainless steel airplanes may still be at some distance in the future, but a series of events in the past few months have probably brought the date closer than was believed possible several months ago. With airplane manufacturers soon to be confronted by gigantic production programs for the U. S. Government in its armament projects, this expected expansion in production may pave the way for the beginning of large scale all-stainless steel airplane manufacture.

Although considerable details have yet to be worked out, most important of which will be the additional tooling of airplane factories, stainless steel and aviation experts alike agree that eventually present contemplated programs will go through.

Stainless steel parts have been used with increasing frequency by airplane manufacturers and have been found to be well suited for such things as fire walls and certain other applications where heat resistance is a factor.

Possibly giving impetus to such a large scale project will be the completion in the next week or so of an all-stainless training plane designed and built for the U. S. Army by Fleetwings, Inc., Bristol, Pa. This company has been a pioneer in the production of stainless steel airplanes and is said to be the only aviation plant in the country completely tooled to turn out this type of a plane.

Fleetwings has also furnished, on an experimental basis for air ships and military service, stainless steel parts, including stainless steel aircraft wings. For the past few years this company has also been producing a stainless steel sports model plane.

From Detroit comes the news that Stout Engineering Laboratories, in conjunction with a steel company, will complete the development of plans for the produc-

tion of hydromatically welded stainless steel airplanes.

The design for this plane was evolved by William B. Stout, who was associated with the Ford Motor Co. when the latter began to produce all metal planes a decade ago.

No plane with the Stout design has yet been built, but wing samples have been tested and the Army has placed an order for one training plane. A new company, known as the Stout Skycraft Corp., is being formed and production stages are estimated to be from three to six months in the future.

From a raw material standpoint, steel mills throughout the country have approximately 10 to 12 months' supplies of chromium ores and expect little or no trouble in obtaining adequate supplies of nickel. Important countries importing chrome ores to this country include Turkey, Greece, South Rhodesia, Union of South Africa, and New Caledonia. In case some of these sources were cut off because of war conditions, supplies can be obtained from the Philippines, and in case of extreme emergency, some methods might be found to utilize low grade domestic ores.

Some Steel Plants, Iron And Coal Mines Are Already Lost To France

Foreign Correspondence

• • • **The North French territory,** now in hands of Germany, supplies normally 52 per cent of coke, 44 per cent of coal, 27 per cent of iron and 22 per cent of steel produced in France as well as about 25 per cent of all machinery and nearly 60 per cent of all hardware.

The unfilled orders in hand of the Luxembourgian, Dutch and Belgian industry on May 10 for the Allies was 298,000 tons, mainly semi-finished.

Rationing of steel in Germany is strictly carried through. Now also the industries not consuming more than 100 tons of steel annually are subjected to a rationing system, and steel for private consumption is limited to not more than 20 per cent of the consumption in 1937, unless, of course, war orders are to be executed.

In Italy a new electric steel production program has been announced. Four works will increase the production of electric steel to at least 11,000 tons monthly; the present production is about 7800 tons.

Prisoners of war in Holland, Belgium and North France are employed mostly to collect the enormous quantity of war derelicts (guns, rifles, cars, aircraft, ammunition), of which organization is in hands of the German steel cartel. The bulk of the arms, etc., will go to scrap yards, and scrap cutting machinery has been sent to the occupied areas. Nearly the whole Dutch Army equipment and the equipment of the Belgian fortresses is being dismantled and sent to German scrap yards.

Steel prices are rising further Abroad. Steel is hardly obtainable in the Near East and Africa. The average advance since May 10 for plates is $9, bars $8 and sheets $11 per ton.

Shipments of Swedish iron ores to Germany are in full swing via Lulea. According to official notice of the Grängesberg Trust, a total quantity of 620,000 tons was to be delivered to German companies in May at f.o.b. Lulea basis and about 770,000 tons in June.

Export-Import Bank May Aid Brazil's Steel Plan

Washington

• • • **Federal Loan** Administrator Jesse H. Jones told THE IRON AGE on Monday that the Export-Import Bank had agreed to "cooperate" with Brazil under certain conditions to aid in the financing of a steel mill in that country. The extent of the bank's participation, he said, would be financing the cost up to $10,000,000 of the necessary equipment and machinery purchased in the United States. Mr. Jones added that the extent and nature of the United States Steel Corp.'s part in the project is not known definitely.

Speed Vital To Defense Of U. S., S.A.E. Is Warned

• • • **The intelligent use** of time now may mean the difference between victory and defeat, Lieut. Col. E. E. MacMorland, of the Ordnance Department, told members of the Society of Automotive Engineers holding their summer meeting this week at White Sulphur Springs, W. Va.

"The War Department is working under high pressure to make effective our part in the preparedness drive," Lieut. Col. MacMorland declared. "We realize that the vital factor is time, the most precious thing in the world. We have a well worked out protective mobilization plan comprising an initial protective force of the regular Army and National Guard to hold the frontiers until we can, in a period of four months, expand this force to one million.

Supplies of essential military material for this initial army is the objective. Obviously, you cannot get the non-commercial items, guns, ammunition, etc., manufactured in four months. They must be on hand in reserve. Moreover, we have only to recall blitzkrieg methods to realize that the guns for this initial force had better be in the warehouses and not on paper for production during the first year of war.

Lieut. Col. MacMorland told the SAE that the nation must press along at maximum speed to get all the essential things authorized by Congress while "we still have the time" with the full consciousness that everything done now may turn out to be just the right margin to keep ahead of disaster until an efficient war organization can become effective.

"I hope that we will have 15 months leeway on this problem. It will take that long to get the guns, ammunition, signal equipment, chemical defense items and all the paraphernalia authorized by Congress."

The present program will not require invocation of the Industrial Mobilization Plan, the Army officer said.

Empire Ordnance Buys Part Of Pencoyd Plant

Philadelphia

• • • **Empire Ordnance Corp.,** New York, a subsidiary of Empire Securities Co., has purchased a portion of the Pencoyd (Philadelphia) plant of Carnegie-Illinois Steel Corp. It is understood that the steel making facilities of this plant are not involved in the sale.

The Pencoyd plant, which has not been operated for a number of years, was formerly used for production and fabrication of structural steel.

Two Large Arms Plants To Be Built in Canada

• • • **The Canadian and British** Governments will begin immediate construction in Eastern Canada of an $8,000,000 shell-filling plant, C. D. Howe, Canadian Minister of Munitions and Supply, announced this week at Ottawa. Canada will likewise enter partnership with the French Government in constructing a larger plant, costing about $12,000,000, for manufacture of explosives.

U. S. Steel Shipments 1,084,057 Tons in May

• • • **Shipments of** finished steel products by United States Steel Corp. subsidiaries in May totaled 1,084,057 tons, compared with 907,904 tons in April, an increase of 176,153 tons, and with 795,689 tons in May, 1939, an increase of 288,368 tons. For 1940 to date, shipments were 5,078,714 tons compared with 4,030,842 tons in the comparable period of 1939, an increase of 1,047,872 tons.

Crucible Lifts Electric Alloy Steel Capacity

Pittsburgh

• • • **In order to meet** increased demand for alloy electric steel, Pittsburgh Crucible Steel Co. is now constructing at its Midland, Pa., plant, the second 25-ton Heroult electric furnace, the first one having been in production the past several months. The company also manufactures open hearth alloy steel.

"We are making all preparations, especially to serve our regular customers to facilitate them in meeting the increased demands with which they will undoubtedly be confronted as a result of the national preparedness program," said R. E. Desvernine, president, Crucible Steel Co. of America.

A. F. ALLEN (above) secretary-treasurer of American Steel & Wire Co., this month achieved a half century of service with subsidiaries of U. S. Steel Corp. and was honored at a dinner at which he received from C. W. Hood, Wire company president, a 50-yr. gold service medal.

War Highlights

• • • **Pullman-Standard** Car Mfg. Co., Chicago, is placing orders for steel (16,000 to 18,000 tons) and machine tools needed to make 200,000 shells for the Allies at the Butler, Pa., plant.

• • • **At Detroit Henry Ford** this week was reported interested in attempting mass production of 1000-hp. in line, liquid cooled airplane engines. On Monday Ford Motor Co. engineers examined a single motored Curtiss P-40 pursuit plane.

• • • **Two torpedo boats,** the PT3 and PT4, constructed by the Fisher Boat Works, Detroit, have been accepted by the Navy. The boats, first of a mosquito fleet, are 59 ft. long, powered by 100 hp. Packard motors, capable of 46 mph.

• • • **At Washington** Edward R. Stettinius, Defense Commission member appointed to his raw materials staff Charles E. Adams, New York, Air Reduction Co. chairman, and Robert T. Stevens, president, J. P. Stevens & Co.

• • • **From Berlin** by way of London came reports that Germany has confiscated all iron and steel of every form for the Army, virtually suspending activity in all factories except those producing war products.

RICHARD LEBLOND (lower left) is the new president of the R. K. LeBlond Machine Tool Co., Cincinnati, succeeding R. K. LeBlond (lower center), who becomes chairman of the board. John LeBlond (lower right) was re-elected vice-president. At the top, left right, are: Harold LeBlond, appointed vice-president; William F. Groene, vice-president; H. C. Pierle, sales manager and secretary; E. G. Schultz, director secretary and treasurer, and W. McK. Reis, director.

• **G. L. Crawford,** who has been identified with the Wickwire Spencer Steel Co., New York, since 1927, has been appointed Buffalo district manager in charge of sales of all products. He continues as sales manager of structural products, the position to which he was appointed a year ago. He will be located at the company's Buffalo district sales offices at 70 Niagara Street.

• **A. I. Richardson,** formerly with the Charlotte, N. C., district sales office of the Allis-Chalmers Mfg. Co., has been appointed manager of the Dallas, Tex., office. He is a native of Texas and a graduate of the Texas A. & M. college in mechanical engineering. He joined the firm in 1925 and spent two years in the shops before going into the sales field at Atlanta, Chattanooga and Charlotte.

• **Max F. Becker,** since last year sales manager of the industrial division of the Whiting Corp., Harvey, Ill., has been made vice-president in charge of sales representatives. He has been identified with the company for 20 years. After his graduation from Purdue University, he first served with the pulverizer division of the company.

• **F. W. Fenner,** heretofore sales representative for the Firth Sterling Steel Co., has been appointed to the Cleveland district by Jessop Steel Co., Washington, Pa. He is a graduate of Case School of Applied Science and began his career as representative for William Jessop & Son. He was later Cleveland manager for Latrobe Electric Steel Co.

• **W. H. Raisbeck,** who was formerly representative for the Anderson Forge & Machine Co., has been made sales representative for Jessop in Milwaukee, with headquarters at the Colby-Abbot Building. Mr. Raisbeck studied mechanical engineering at the University of Iowa.

• **Deane Murphy** has been made Eastern manager of flat rolled carbon steel sales, Allegheny Ludlum Steel Corp., with headquarters in New York. Mr. Murphy entered the employ of the U. S. Steel Corp. in the flat wire and spring department of the American Steel & Wire Co. and in 1910 was transferred to the sales department in New York. He joined the West Leechburg Steel Co., in charge of the Eastern territory, in 1917, and when this company was absorbed by Allegheny Steel Co., Mr. Murphy was assigned to the New York sales office.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **D. W. Russell** has been named president of Airtemp division of Chrysler Corp. Airtemp is the company's air conditioning and heating division at Dayton, Ohio. Mr. Russell succeeds **Col. A. C. Downey,** who is taking an extended leave of absence because of ill health. Mr. Russell became identified with Chrysler in 1931, with 18 years of experience in engineering, mechanical and sales fields. Since that time he has done technical sales work in the company's Fargo division of which he was made vice-president in 1932.

G. L. CRAWFORD, new Buffalo district manager for Wickwire Spencer Steel Co.

• **George E. Price, Jr.,** purchasing agent, Goodyear Tire & Rubber Co., Akron, Ohio, has been elected president of the National Association of Purchasing Agents for 1940-41. Mr. Price, a graduate electrical engineer, has been buying for the Goodyear organization since 1922, and became purchasing agent in 1937. Intensely interested in military procurement service, he holds a major's commission in the Quartermaster Corps, U. S. Army, and is assigned as war time procurement officer of automotive equipment at the Akron district office, under the Assistant Secretary of War. The new president's activity in purchasing agent association work is more extensive even than the history of the association which he now heads. In 1913, while buying for the Davis-Bournonville Co., Jersey City, N. J., he was one of the founders of the New York Purchasing Agents Association, two years before the national organization came into being.

• **C. R. Mitchell, Jr.,** has been appointed assistant district manager of sales for the New York district office, Allegheny Ludlum Steel Corp. A graduate of the University of Pittsburgh, he started to work with the Allegheny Steel Co. in 1931. From 1931 to 1934, when he was transferred to the New York office, Mr. Mitchell's activities were in various capacities in the mill at Brackenridge, Pa.

• **MacGilvray Shiras,** director of raw materials, Carnegie-Illinois Steel Corp., has retired with a service record of more than 47 years. He has been associated with the subsidiary of United States Steel Corp. since 1893. Mr. Shiras received his early education in the Sharon schools. He studied chemistry under Prof. E. T. Aschman, of the Aschman Steel Casting Co., Sharon, and after completing his course was employed by the Ohio works of Carnegie Steel Co., as a chemist. From 1897 to 1900 he was in charge of pyrometers and was a blast furnace burden clerk at Duquesne works, shortly thereafter becoming assistant superintendent of blast furnaces.

In 1901 Mr. Shiras went to Pittsburgh as assistant ore agent for

Carnegie Steel Co. and in 1910 was appointed ore agent. He was made director of raw materials for Carnegie-Illinois in 1935, the position he held at his retirement.

• **M. M. Cadman** will succeed Mr. Shiras as director of raw materials. Mr. Cadman attended high school in Pittsburgh and was graduated from the Pennsylvania State College in mining and metallurgy in 1898. On June 1, 1903, he joined the Carnegie Steel Co. as assistant ore agent. He was appointed assistant director of raw materials in October, 1935.

• **A. E. Eck** has been made general superintendent of operations of Central Iron & Steel Co., Harrisburg, Pa., succeeding the late Warren Elsey, Jr. **William F. Zerbe** has been appointed assistant general superintendent, succeeding Mr. Eck. Before going to Central in 1916 as chief draftsman, Mr. Eck was associated with the operating and engineering departments of Cambria Steel Co., Johnstown, Pa., and the engineering department of Carnegie Steel Co., Pittsburgh. He became chief engineer at Central in 1925 and early in 1939 was appointed assistant general superintendent. Mr. Zerbe entered the employ of Central Iron as an apprentice chemist in the chemical laboratories in 1911. In 1923 he was made chief chemist and in 1931 was promoted to the position of chief metallurgist.

• **H. Mansfield Horner,** who became identified with Pratt & Whitney Aircraft in 1926, has been made general manager of the Pratt & Whitney Aircraft division of United Aircraft Corp., East Hartford, Conn. **Sidney A. Stewart** has been appointed general manager of the Hamilton Standard Propellers division, and **Charles J. McCarthy,** general manager of the Vought-Sikorsky Aircraft division. **Raycroft Walsh,** who was recently elected vice-president of the corporation, has been charged with immediate supervision and control of the operations of the several divisions.

• **Herman H. Bushong,** heretofore superintendent of the McDonald mills of Carnegie-Illinois Steel Corp., has been promoted to the superintendency of the bar mills of the Carnegie-Illinois company at Gary, Ind. He has been identified with the Carnegie company for 32 years. He was transferred to McDonald in 1929 and was made superintendent in 1935.

C. P. KIMMEL, assistant to the general superintendent of Gary works of Carnegie-Illinois Steel Corp., who has retired, as announced in these columns last week.

• **A. H. Grossman** has been named superintendent of process of Packard Motor Car Co. Mr. Grossman assumed the duties in the process department June 3 in addition to his former duties in charge of tool making, machine repairing, cutter grinding and tool crib. He has been with Packard approximately a quarter of a century, having started as a tool maker. He succeeds **L. F. Beech,** now with the Detroit Transmission plant.

MARSHALL WILLIAMS, whose retirement as assistant to president of American Bridge Co. was announced in these columns last week.

• **Sidney Isenberg,** a recent metallurgical engineering graduate of Ohio State University, has joined the research staff of Battelle Memorial Institute, Columbus, Ohio. He has been assigned to the ore concentration division.

• **Fred H. Pinkerton,** sales promotion manager of the Mechanical Goods Division of U. S. Rubber Co., New York, has been elected president of the Industrial Marketers of New Jersey.

• **S. C. Hamilton,** who has been district sales manager at Birmingham for the Chicago Bridge & Iron Co., Chicago, has been transferred to Houston, Tex. He will be succeeded at Birmingham by **H. F. Stearns,** who is being transferred from the New York office. **R. A. Williams,** who has been handling the sale of Morse filter plants, is to be sent to the Dallas, Tex., office. Other changes include: **A. H. Heineman,** from New York to the Birmingham sales department; **Herbert A. Guerin,** from Cleveland to New York; **George Jewett,** from Chicago to New York; **William Fickett,** from Chicago drafting room to the Chicago sales office; **Ray Menefee** from Chicago engineering department to Cleveland office, and **Kenneth Sandbach** to the Philadelphia sales office.

• **Harvey C. Fruehauf,** president of Fruehauf Trailer Co., Detroit, and **C. R. Alden,** chief research engineer for Ex-Cell-O Corp., Detroit, received honorary degrees in engineering from Detroit Institute of Technology on June 10.

• **L. A. Chaminade,** chassis units engineer, Chevrolet Motor division, General Motors Corp., has been elected chairman of the Detroit section, Society of Automotive Engineers. **E. W. Austin,** general manager of sales, Timken Roller Bearing Co., is secretary and chairman of the meetings committee. **F. W. Marschner,** Western sales manager, New Departure division, General Motors, is treasurer.

Obituary

• **Edward P. Hammond, Sr.,** Detroit truck and automotive parts manufacturer, died May 28 in Providence Hospital after an illness of several months. Mr. Hammond was president of the Gemmer Mfg. Co., had been treasurer of Federal Motor Truck Co. and was director of numerous other Detroit concerns. He attended the Detroit University School, the University of Detroit and University of Michigan. Immediately after leaving college, he joined the Gemmer company and became its president in 1912. He became connected with Federal Motor Truck Co. in 1910 and became treasurer in 1912. He was 56 years old.

• **Thomas F. Cashin, Sr.,** director of welfare for the Dodge Brothers Co. and more recently for the Chrysler Corp., died May 23 at his home at Grosse Pointe Farms, Mich. Born in Detroit, Nov. 2, 1873, he was educated in Detroit schools and the old Detroit College. He joined Dodge Brothers Co. in 1920. In the past 20 years he became noted in industrial welfare activity and among other things was vice-president of the Chrysler Industrial Association, and president of the Hamtramck Chamber of Commerce for three terms.

• **John H. Cavender,** vice-president and director of the North American Refractories Co., Cleveland, died May 29. Long prominent in his field, Mr. Cavender had been vice-president of the refractories company since its formation in 1929. Prior to that he was vice-president of the Dover Firebrick Co., one of the companies merged to form North American. Earlier he had been with the Chicago Retort & Firebrick Co. He was the first treasurer and a former president of the Refractories Manufacturers Association now known as the American Refractories Institute. He was 55 years old.

• **Stephen W. Tener,** an early leader in the industrial safety movement and a veteran employee of American Steel & Wire Co., which he served for many years as manager of the accident, safety and pension department, died in East Cleveland, May 24. Born in Ireland on March 25, 1865, he came to this country at the age of seven and was first employed by the Standard Nut Co. in Pittsburgh. He later served as vice-president and then president of the Oliver Wire Co. In 1899, when this became part of the American Steel & Wire Co., he became assistant manager of the Pittsburgh district, which position he held until Aug. 15, 1904, when he went to Cleveland to head the safety department. Mr. Tener retired in 1932.

• **John Nooter,** president and chairman of the board of the John Nooter Boiler Works Co., St. Louis, was killed in an automobile accident in Washington, Pa., on May 28. Mr. Nooter was born in Amsterdam, Holland, 73 years ago. In 1896 he established the boiler business. Two sons, Harry and Edgar Nooter, have been connected with the company since they left school.

• **Alvin H. Emery,** proprietor of the Hamlin & Emery Brass Co., Roxbury, Mass., died suddenly at his home in Brookline, Mass., on May 18.

• **Haddon G. Carlson,** purchasing agent at the Milcor Steel Co., Milwaukee, for the last 17 years, died May 19 in a Milwaukee hospital after a heart attack. He was born in Muskegon, Mich., and went to Milwaukee 26 years ago. He was 45 years old.

• **George Mattlin,** 66 years old, an erecting engineer for the Allis-Chalmers Mfg. Co. Milwaukee plant 27 years, died at his home in Milwaukee, May 31, after an illness of a week.

• **Elmer H. Kramer,** formerly employment manager of the industrial relations section of General Motors Corp. and for the last six years personnel director of Buick Motor Division at Flint, died in Dayton on June 7. Born in Dayton 51 years ago, he began work as a messenger boy for National Cash Register Co. He joined General Motors in 1919 as employment manager of the research division.

• **Harry T. McDonald,** research engineer for Caterpillar Tractor Co., Peoria, Ill., died of heart disease at his home in that city on June 3, aged 48 years. He had been identified with the company and its predecessor for 22 years.

• **George L. C. Bourne,** since 1932 chairman of the board of the Superheater Co. and of Combustion Engineering Co., New York, died on May 25, aged 67. Coming to this country from Canada in 1893, he spent his early years in railroad work. From 1901 to 1910 he was vice-president of the Railway Materials Co. and later helped found the Superheater Co., of which he was vice-president and in 1915, president.

• **Hyman Botwinik,** president of Botwinik Brothers, machinery and equipment, New Haven, Conn., died of a heart attack at his home in that city on June 2, aged 51 years. He was also president of the Harris Iron & Metal Co., and a director of the National Pipe Bending Co.

• **William H. Shook,** superintendent of the United States Register Co. plant at Battle Creek, Mich., died June 7, aged 58 years.

• **John Wesley Collins, Sr.,** manager of the Detroit plant of the Aluminum Co. of America, was buried June 4 at Detroit. Mr. Collins, born 54 years ago in Strathroy, Ont., had been a resident of Detroit for 35 years. He was a past president of the Detroit chapter of the American Foundrymen's Association, vice-president of the Hamtramck Board of Commerce, president of the Milwaukee Junction Manufacturers Association and a member of the Detroit Board of Commerce.

• **John J. Cusack,** vice-president and sales manager of the Meter Devices Co., Canton, Ohio, died May 30, aged 37 years.

• **Hugh K. Rhodes,** 25 years old, a salesman for the American Screw Products Co. died June 2, at his home in Detroit after an illness of six weeks.

• **Harry H. Johnson,** associated with the Budd Wheel Co. for 20 years, died at his home in Detroit on June 2. Mr. Johnson had been with the Budd Wheel Co. for 12 years in the wheel sales department. He was 49 years old.

April Steel Exports from U. S. Decline 14% to 391,754 Tons

• • • Down 14 per cent from the level of the preceding month, United States exports of iron and steel products (scrap excepted) in April totaled but 391,754 gross tons valued at $29,223,257, preliminary figures released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce reveal.

Shipments in March had reached the high level of 457,052 tons valued at $34,220,853, while a year before—in April, 1939—this trade had amounted to only 153,884 tons valued at $12,245,537.

United Kingdom Took 69,042 Tons In That Month; Canada 45,721 Tons

Despite the decline noted above exports accomplished between Jan. 1 and April 30, 1940—1,681,455 tons valued at $127,958,676—were virtually three times as great as those of the comparable period of 1939—585,547 tons valued at $44,802,484.

April imports of iron and steel products totaled 6192 tons valued at $1,026,425 (excluding scrap), an increase of 22 per cent in quantity over March.

Exports to Europe totaled only 137,583 tons against 153,326 tons in March, North and Central America and the West Indies took only 65,935 tons as compared with 73,870 tons in the month preceding.

IMPORTS					EXPORTS			
Four Months Ended April		April			April		Four Months Ended April	
1939	1940	1939	1940		1940	1939	1940	1939
8,359	4,815	3,512	286	Pig iron	16,285	1,599	76,415	13,507
18,307	6,147	3,776	1,507	Ferromanganese and Spiegeleisen[1]	111	7	5,889	34
655	436	149	64	Ferrochromium and ferrosilicon[1]	*	*	*	*
107	190	37	26	Other ferroalloys[1]	312	50	2,011	243
603	*609*	*152*	*368*	Sponge iron	*	*	*	*
8,295	1,226	2,769	482	Scrap: iron, steel, tin plate	221,152	240,124	850,253	1,005,183
36,326	*13,423*	*10,395*	*2,733*	*Pig iron, ferroalloys and scrap*	*237,860*	*241,780*	*934,568*	*1,018,967*
89	406	40	45	Ingots, blooms, billets, sheet bars	79,551	4,620	284,413	33,835
*	....	....	....	Ingots, etc.: stainless, other alloys	553	1,614	4,723	6,338
*	....	....	....	Skelp	989	824	15,332	2,917
3,366	3,848	638	1,382	Wire rods	15,516	1,791	58,352	5,158
3,455	*4,254*	*678*	*1,427*	Semi-finished steel	*96,609*	*8,849*	*362,820*	*48,248*
816	65	325	8	Sheets, black iron and steel[2]	34,197	21,945	158,430	95,673
*	....	....	....	Sheets, galvanized iron and steel	14,012	9,593	62,562	30,703
*	....	....	....	Sheets, alloy steel	1,098	195	2,751	863
....	....	....	....	Sheets, stainless	198	92	766	261
3	4	1	....	Plates, plain and fabricated	42,062	23,955	139,583	84,440
*	....	....	....	Plates, alloy	219	83	923	261
*	....	....	....	Plates, stainless	40	5	104	22
8,260	1,563	2,391	536	Bars, merchant and reinforcing	42,504	10,986	191,852	46,008
229	189	41	31	Bars, iron[3]	251	72	6,527	245
*	....	....	....	Bars, alloy steel	3,176	752	8,294	4,241
*	....	....	....	Bars, stainless	137	51	340	183
372	754	75	183	Bars, hollow steel	*	*	*	*
6,982	571	1,549	112	Hoops, bands, strips, cotton ties	12,722	4,158	61,492	23,236
*	....	....	....	Hoops, bands, strip: alloy steel	108	56	333	127
*	....	....	....	Hoops, bands, strip: stainless	74	113	269	335
462	....	462	....	Piling, sheet	534	727	2,756	1,580
15,684	580	5,873	46	Structural shapes	19,864	7,219	64,152	24,748
5	....	....	....	Structural material, fabricated[4]	3,979	3,279	23,425	10,536
19	37	....	11	Tin plate, terne plate, taggers' tin	32,465	17,296	203,339	58,280
....	....	....	....	Tanks, steel	4,299	2,081	10,171	6,778
26,457	1,782	16,119	565	Pipe, welded iron and steel, etc.	7,696	3,869	34,994	14,854
....	....	....	....	Casing and oil line pipe	17,477	6,968	73,736	22,416
*	....	....	....	Boiler tubes	1,906	700	8,223	2,191
1,056	767	140	277	Wire, round iron and steel, telephone	6,470	1,888	30,021	8,409
796	320	296	60	Wire rope, strand, other products	831	590	3,766	1,768
6,546	44	1,815	44	Wire, barbed, woven products	2,790	4,030	10,843	12,972
1,855	1,195	477	392	Wire, flat, all other types	11,779	3,955	40,780	16,121
3,525	83	1,419	17	Nails, tacks and staples	545	333	2,011	1,507
43	101	7	24	Bolts, nuts, rivets, washers, etc.	1,280	722	4,745	2,631
2,166	310	1,567	13	Rails and track material	6,629	8,106	43,672	24,462
15	11	1	3	Die blocks or blanks, etc.	*	*	*	*
162	3	29	....	*All other finished steel*	1,069	650	7,484	2,109
75,453	*8,379*	*32,587*	*2,322*	Rolled and finished steel	*270,330*	*134,478*	*1,208,344*	*497,960*
275	419	72	....	Cast iron pipe and fittings	2,964	4,511	16,750	11,258
20	2	....	2	Malleable iron pipe fittings	436	323	1,842	1,150
736	307	351	190	Castings, forgings: iron and steel	2,541	1,751	9,877	4,872
*	....	....	....	Castings, forgings: alloy and stainless	462	266	1,838	1,089
*	....	....	....	Carwheels and axles	1,704	2,050	5,669	7,186
1,031	*728*	*423*	*192*	*Castings and forgings*	*8,107*	*8,901*	*35,976*	*25,555*
116,265	*26,784*	*44,083*	*6,674*	Total	*612,906*	*394,008*	*2,531,708*	*1,590,730*

[1] In imports the tonnage shown is the alloy content; the manganese, chromium and silicon content, as the case may be. [2] Imports include skelp and saw plate. [3] Import figure included iron slabs. [4] Imports include sashes and frames only.
*No separate figures.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	June 11, 1940	June 4, 1940	May 14, 1940	June 13, 1939
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.00
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.00
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plates:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.20
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.45
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finish[illegible] Steel:				
(Dollar[illegible] Per Ton)				
Rerolling [illegible]	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	1.92
Skelp (grvd.)	1.90	1.90	1.90	1.90

	June 11, 1940	June 4, 1940	May 14, 1940	June 13, 1939
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese‡	100.00	100.00	100.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

	June 11, 1940	June 4, 1940	May 14, 1940	June 13, 1939
Scrap:				
(Per Gross Ton)				
Heavy melting steel, P'gh.	$20.25	$19.00	$18.75	$15.25
Heavy melting steel, Phila.	19.50	19.00	17.25	15.50
Heavy melting steel, Ch'go	17.75	17.75	16.75	13.625
Carwheels, Chicago	19.00	19.00	18.25	12.75
Carwheels, Philadelphia	20.75	20.75	20.75	16.00
No. 1 cast, Pittsburgh	20.25	19.25	18.75	15.25
No. 1 cast, Philadelphia	20.75	20.75	20.25	16.25
No. 1 cast, Ch'go (net ton)	17.00	17.00	16.25	12.25
Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$4.00	$4.00	$4.00	$3.75
Foundry coke, prompt	5.25	5.25	5.25	4.75
Non-Ferrous Metals:				
(Cents Per Lb. to Large Buyers)				
*Copper, Electro., Conn.	11.50	11.50	11.50	10.00
Copper, Lake, New York	11.50	11.50	11.50	10.00
Tin (Straits), New York	57.00	55.00	53.00	48.25
Zinc, East St. Louis	6.25	6.25	5.75	4.50
Lead, St. Louis	4.85	4.85	4.85	4.60
Antimony (Asiatic), N.Y.	16.50	16.50	16.50	14.00

* Producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 103 to 112. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
June 11, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.261c. a Lb.	$22.61 a Gross Ton	$18.58 a Gross Ton
One month ago	22.61c. a Lb.	$22.61 a Gross Ton	$17.58 a Gross Ton
One year ago	2.236c. a Lb.	$20.61 a Gross Ton	$14.79 a Gross Ton

	High	Low	High	Low	High	Low
1940	2.261c., Jan. 2	2.211c., Apr. 16	.....	.....	$19.17, June 11	$16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Steel production jumps five points to 85½ per cent, scrap prices rise, as buying gains . . . U. S. defense program will soon be a factor . . . Heavy additional buying by the Allies hastened by war developments

WITH war developments hastening the placing of additional large tonnages of steel in the United States by the Allies, with our own national defense program taking form, the steel industry moves into higher operations, accompanied by sharp price rises in iron and steel scrap.

A gain of five points to 85½ per cent is indicated for steel production this week, the highest since early January. Three districts—Buffalo, Detroit and Wheeling-Weirton—are at practical capacity, the Chicago district is at 92 per cent and gains are recorded in nearly all other areas.

While some of the bulge in steel production this month is due to heavy specifications for sheets and strip against recent low-priced commitments, there have been gains in orders for nearly all products. If steel shortages occur they will probably be experienced first in semi-finished steel, especially forging billets, hot rolled bars and alloy steels of all types. Expansion of electric furnace capacity to take care of increasing demand for high quality alloy steels will soon be under way.

Consumers of steel are swayed between the desire to build up inventories that will afford reasonable protection against delayed deliveries, Government priorities and higher prices and the caution engendered by the unpredictable outcome of the war. Most of them are pursuing a middle course and hence inventories are not being unduly enlarged.

FOLLOWING the arrival here a week or so ago of a delegation of steel men representing the Allies and the transfer of steel purchasing from London to the Anglo-French Purchasing Board in New York, heavy steel orders, amounting to 600,000 tons or more, have been placed by the Allies. A considerable part of this is shell steel for the French, who are also trying to place shell contracts with American manufacturers, including, for example, one for 2,500,000 shells per month for 75 mm. guns.

While Britain may continue to take a large quantity of semi-finished steel, France is placing orders for a good deal of finished steel, a condition undoubtedly brought about by the fact that roughly half of French coal and coke capacity and about a quarter of iron and steel capacity is behind the German lines in northern France.

A greater war effort in Canada will also bring addition steel orders to the United States. Canada will build 300 tanks, for which armor plate must be supplied either by Great Britain or the United States. Canada's airplane program also must depend now on obtaining engines from American makers.

Italy's entrance into the war has immediately shut off exports not only to that country but to all Mediterranean countries. When war was declared boats were being loaded with scrap at Eastern ports. But work was stopped at once and the scrap is being diverted to domestic consumers. In the first four months of this year Italy took from the United States 14,250 tons of iron and steel and 204,045 tons of scrap, while in 1939 it bought $770,880 worth of metal-working machinery here.

WHILE there has not yet been time for steel orders in appreciable volume to result from our national defense program, the moves that are being made in Washington assure a flow of orders from that source within the near future. Without waiting for final action on the Vinson naval bill by the Senate, the Government is arranging for a huge expansion of Naval shipbuilding which will utilize all existing Government and private yards and provide for new facilities. Under their contracts with machine tool builders, the Army and Navy have already commandeered some machine tools which were ready for export.

Full power to embargo or curtail export shipments of "any military equipment or munitions or component parts thereof, or machinery, tools or material necessary for the manufacture or servicing thereof" is given to the President in the May-Sheppard bill, which has passed the House.

In addition to the munitions orders to be placed by the U. S. Government and the Allies, new steel business in the near future will include substantial purchases by the automobile industry for 1941 models and there are indications that the railroads may soon be forced into equipment building and repair programs.

Rapidly advancing scrap prices and the fear of shortages have brought forth suggestions for Government control of procurement and prices, but the time may not be ripe for this step. The past week's advances have carried THE IRON AGE scrap composite price up 59c. to $19.17. From the low point in April, the composite has regained nearly half of the loss from the high of $22.50 last October.

The Industrial Pace . . .

OUTPUT OF THE DURABLE goods industry, as measured by THE IRON AGE capital goods index, resumed its upward movement in the past week, after suffering a temporary setback in the holiday week. Every component of the index advanced in the past week, causing the combined index number to jump 6.6 points to 82.4. This index number is the highest recorded in 15 weeks, but is still close to 18 points below the year's high point of 100 reached in the second week of January.

Outstanding movement of the week was the rebound of the automobile series from the holiday week dip. The index of this series in the past week stood at 84.4, after seasonal adjustment, as compared with 66.2 in the holiday week and 82.3 three weeks ago. While the sharp decline in the holiday week was in keeping with experience of past years, the advance in the past week to a point above the pre-holiday week level is without precedent in recent years.

Steel output continued its counterseasonal rise, while the loss in lumber carloadings in the holiday week, after allowance for the shorter work period, was less than seasonal.

The volume of heavy construction awards placed in the past week was slightly below the year's peak reported in the preceding week, but was still substantially above the average of the past three months. The past week's total of $64,967,000, compares with an average of $58,300,000 for the past 13 weeks. Housing projects and industrial buildings continue to account for an important share of new construction activity.

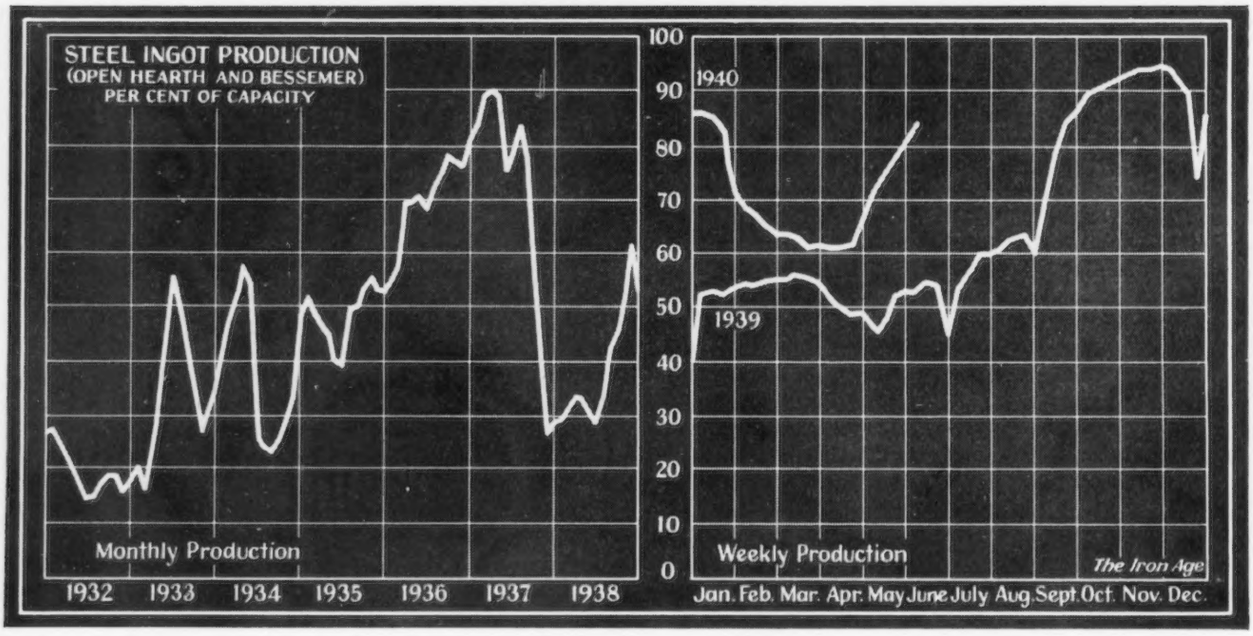
Private construction awards placed thus far this year are 15 per cent above the comparable period of a year ago, while publicly financed work shows a loss of 25 per cent.

Reflecting the recent improvement in building activity, engineering construction awards placed in May were at the highest level reached so far this year.

As the accompanying graph indicates, May awards, totaling $282,296,000, were exceeded on several occasions in 1939. However, there has been a decline of almost 25 per cent in public activity this year, leaving the task of filling this void entirely to privately financed work. With prospects of intensified expansion of industrial facilities and increased activity in the construction of public works associated with national defense, the month-to-month trend will likely continue upward for some time.

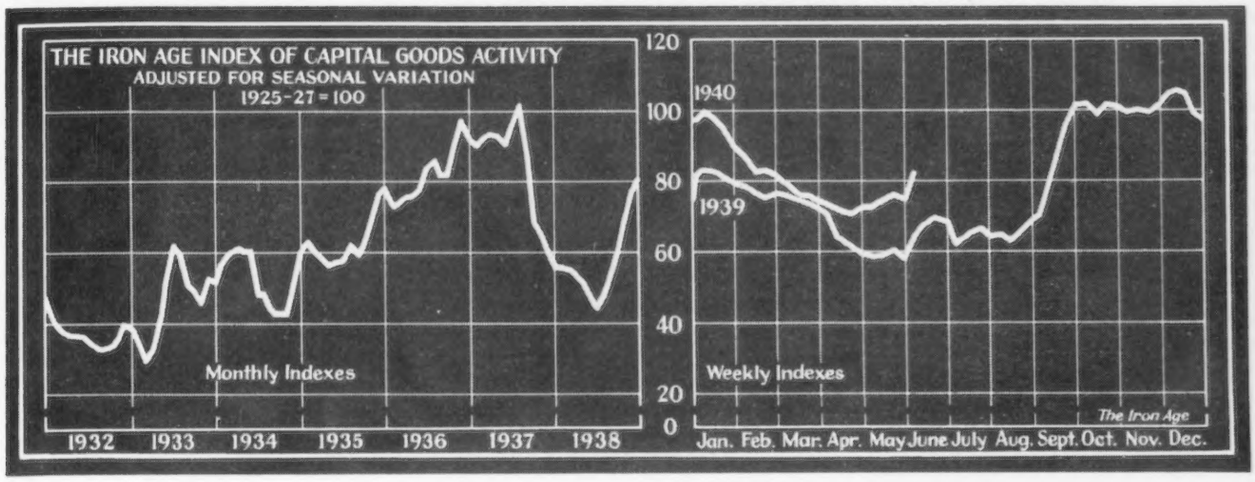
Withdrawal of the bargain prices on sheets and strip on May 1, caused THE IRON AGE finished steel composite price in May to regain the level prevailing earlier in the year. While the May level is slightly above the prices ruling during most of May, 1940, they are, with the one exception of October, 1938, substantially below the prices prevailing in 1938. With the exception of January and February, 1937, the past month's prices are also below the 1937 level.

Steel Output Jump Five Points to 85½%



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week	82.0	92.0	77.0	84.0	81.0	100.0	99.0	100.0	89.0	84.0	71.0	73.5	50.0	**85.5**
Previous Week	81.0	85.5	73.0	80.0	79.0	94.0	91.0	79.0	84.5	74.0	71.0	67.0	50.0	**80.5**

Rate of Heavy Goods Output at Highest level in 15 Weeks

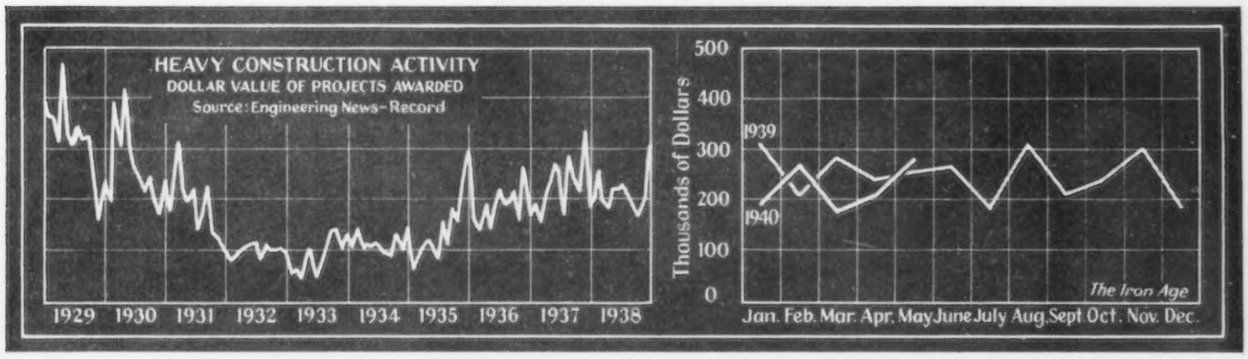


▼Components Week Ended ➤	June 8	June 1	May 11	June 10 1939	June 8 1929
Steel ingot production[1]	111.3	104.1	86.2	73.9	135.7
Automobile production[2]	84.4	66.2	82.3	57.6	127.9
Construction contracts[3]	54.3	52.9	52.7	74.7	128.0
Forest products carloadings[4]	63.6	61.4	55.1	54.0	113.6
Pittsburgh output and shipments[5]	98.2	94.4*	85.5	67.4	127.7
COMBINED INDEX	82.4	75.8*	72.4	65.5	126.6

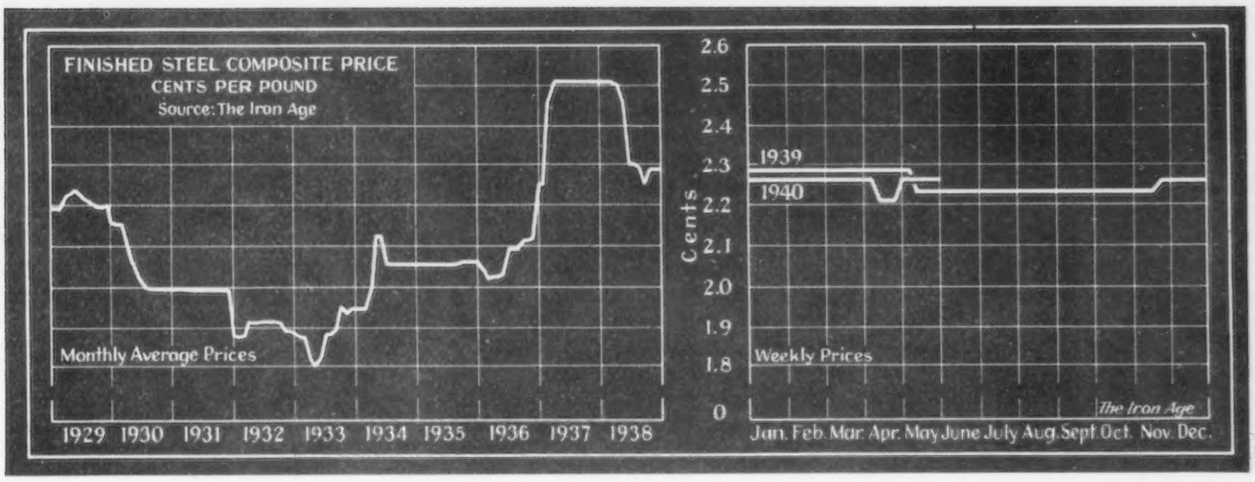
* Revised

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record*; [4] Association of American Railroads; [5] University of Pittsburgh. The indexes of forest products carloadings and activity in the Pittsburgh area reflect conditions as of the week ended June 1. Other indexes cover the week of June 8.

May Engineering Construction at New High for 1940



May Finished Steel Composite Price Above Year Ago



Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

Steel Operations

. . . Industry rate jumps five points to 85½% . . . Blast furnaces go in

The rate of production of steel ingots has jumped five points this week to 85½ per cent, approximately the rate of mid-January last. The further rise in steel output has been accompanied by the blowing in of additional blast furnaces.

The BUFFALO and DETROIT districts are operating at 100 per cent, the WHEELING-WEIRTON district is close to that figure, the CHICAGO district is at 92 per cent and the BIRMINGHAM district has hit 89 per cent. PITTSBURGH is up one point at 82 per cent. Gains in some districts which have lagged behind are expected during the next few weeks.

New Business

. . . Volume of orders continues to expand, backlogs growing

Total steel specifications at PITTSBURGH including domestic and foreign were received in such a steady volume in the past week that aggregate bookings were in most cases more than theoretical capacity. While some of this rush is attributed to sheet and strip releases, demand for other steel products from domestic consumers has risen substantially and represents some inventory building.

Aggregate steel orders at CLEVELAND during the first 10 days of June showed a gain of around 20 per cent over the comparable part of May. Backlogs are growing in semi-finished, carbon bars, alloy steel, sheets and tin plate. Order books are being cleared of suspended tonnage some of which has been awaiting release for months.

Pig iron shipments hold promise of a 40 per cent gain this month over May. The iron ore movement from upper Lake ports is being accelerated, output of some mining companies being heavily booked. Scrap markets are active.

Additional electric furnace installations are contemplated at several points in Ohio. Demand for electric furnace alloy steel has greatly exceeded capacity.

Steel orders continue to pour in to CHICAGO sales offices, and June is running ahead of the same period last month. The leading tonnage items, as was also the case a week ago, are semi-finished steel, sheets and strip and merchant bars. Semi-finished is being produced in the form of shell steel for shipment to the Allies, forging billets for commercial forging companies in the CHICAGO district and billets and slabs for non-integrated mills.

Tremendous tonnages of shell steel are available to steel mills for the taking, and it is considered likely that more of this business will come into this district provided domestic demand can be met first. In addition to shell steel, large orders for nearly all types of steel are available for shipment abroad. Acceptance in almost every case depends largely upon the demands that are likely to be made on the industry by regular customers.

New business for several weeks has been coming in at a rate higher than production and backlogs are being built up in many products.

Buying of steel for the wind-up of 1940 models for Ford Motor Co. is expected within the next few days. Ford, scheduled to buy steel for 40,000 to 50,000 cars in May, has held up action on the material.

Conjecture by steel suppliers is that Ford may also place initial 1941 requirements, although possibility of interference from military work is foreseen.

Major buying of 1941 automotive steel requirements has failed to develop, although not overdue. Only scattered orders have been placed, according to Detroit sources of information.

Buyers in the PHILADELPHIA area continue to seek coverage at an active pace, with most buyers clamoring for quick shipments. Few sellers in that district are able to make definite delivery commitments and are generally accepting orders for shipment at mill's convenience. Independent plate mills in EASTERN PENNSYLVANIA are rapidly increasing output. Orders received by these sources are chiefly directly associated with Allied war requirements and the United States defense program. Canadian purchases in several directions were especially heavy in the past 10 days. Shipyard releases are contributing heavily to district operations, but railroad buying is still limited to small repair work.

Prices

. . . New quotations announced on concrete reinforcing bars

Concrete bar makers are quoting a minimum of 1.90c. a lb. f.o.b. major basing points on new billet steel reinforcing bars, and 1.80c. on rail steel reinforcing bars, with $4 a ton allowance to distributers. These latest quotations effectively bury the so-called and purely nominal published prices which were announced for the third quarter and which were supposed to be 2.15c. a lb. at major basing points on new billet steel.

Pig Iron

. . . Italy's war entry blocks shipments to Mediterranean

• • • **Buying has slackened** at most centers since a majority of consumers are now protected for the third quarter. Entry of Italy into the war and the consequent barring of the new Mediterranean war zone to American vessels has affected exports to countries in that area but the loss is likely to be offset by heavier demand from the Allies. Seizure by the Germans of much of Northern France, including many industrial centers, is expected to lift shipments to France.

A further pickup in pig iron demand and shipments is reported at PITTSBURGH, PHILADELPHIA and ST. LOUIS, the Eastern Pennsylvania improvement being a secondary buying movement, with some plants contracting for more iron than possibly can be used in the third quarter. Buying at CLEVELAND has tapered during the past week and

the CINCINNATI market is less active. Ordering at BOSTON has also declined. At many points higher scrap prices continues to increase the use of pig iron.

Pig iron shipments at CHICAGO thus far in June are running ahead of the corresponding period a month ago. Foundry consumption is somewhat better but the major increase is coming from shipment of basic iron to steel mills lacking blast furnaces.

Over the week-end an Iroquois stack has been blown in to replace the Federal furnace that was banked June 1, and the Zenith stack at Duluth came into blast. South works of Carnegie Illinois Steel Corp. blew in its ninth furnace last week.

Republic Steel Corp. was schedуued Tuesday to blow in stack No. 1 at the Corrigan-McKinney works, Cleveland, after enlarging its capacity to 1000 tons. Work was begun in March.

Semi-Finished Steel

. . . Heavy demand includes large sales for export

There has been little or no letup in total demand for semi-finished products within the past week. Skelp movement is unusually strong and sheet bars are in great demand. Export requirements constitute a substantial portion of total bookings. Some steel companies which had been selling semi-finished steel are at or near the point where requirements from their own rolling mills will prohibit further commitments.

Semi-finished material continues one of the most sought after steel products in the CHICAGO district. Heavy tonnages have been placed in the past week by export agencies, non-integrated mills and forgers. Some Chicago plants are producing shell steel and it is likely that considerably more of this product will be rolled here as the war progresses. Tremendous tonnages are available to the steel mills equipped to handle this type of work but acceptances are dependent in almost every case upon ability to take care of the regular domestic trade first. This probably will be the attitude followed by all steel producers unless some form of Government priority is exercised.

Semi-finished sales at CLEVELAND and YOUNGSTOWN are running ahead of the heavy daily average for May and include Allied buying.

Structural Steel

. . . Defense projects prominent in awards and inquiries

Fabricated structural steel awards at 17,550 tons are slightly higher than a week ago. The largest lettings are chiefly for the Government and include 5000 tons for Naval air and fleet bases at Sitka and Kodiak, Alaska; 1635 tons for a terminal building and hangar at Gravelly Point, Va., and 1500 tons at Jacksonville, Fla., for an assembly and repair shop for the Navy Department. In New York, 1500 tons was awarded for the Cardinal Hayes Memorial High School in the Bronx.

New structural steel projects advanced to 28,925 tons from 20,100 tons last week. Outstanding inquiries are 8000 tons for Atlantic Avenue improvements in Brooklyn for the Long Island Railroad; 4000 tons for two buildings at the Patterson Aviation Field, Dayton, Ohio; 3500 tons at Peoria, Ill., for the superstructure of the Harvard Street bridge; 2000 tons at Alameda, Cal., for four hangars for the Naval Air Station, and 1900 tons at Caldwell Township, N. J., for a boiler house, factory and office building for the Curtiss-Wright Corp.

Structural specifications at PITTSBURGH are coming in at a fair rate with further improvement in prospect. It is understood that substantial export fabricated business has been placed in recent weeks.

Plates

. . . Orders increasing in total volume . . . Allies buy plates

Foreign and domestic bookings at PITTSBURGH, so far this month, are somewhat ahead of the corresponding period a month ago. When and if a major railroad car building program begins, it will find plate mills operating at a high rate of capacity on demand from other quarters.

At CHICAGO, orders for plates in the past week from structural fabricators and tank builders have been satisfactory. According to CHICAGO sellers, there are good prospects in sight for a continuation of this trend. It is believed likely, though no definite inquiries have as yet come out, that sizable car building or repair programs will be announced in the near future by several railroads.

Deliveries continue prompt at CLEVELAND. Miscellaneous buying has been good, but large tonnages are irregular.

Production schedules of Eastern Pennsylvania producers are being stepped up rapidly to keep pace with the recent spurt in orders. Demand for ship and floor plates from Canada is very active and Allied requirements are also contributing to the better volume of incoming business.

As much as 6100 tons of plates will be required for the Burbank-Santa Monica distribution line of the Los Angeles Metropolitan Water District if steel pipe alternates are successful throughout. Bids are set for June 25.

Sheets and Strip

. . . Heavier orders from automobile industry expected soon

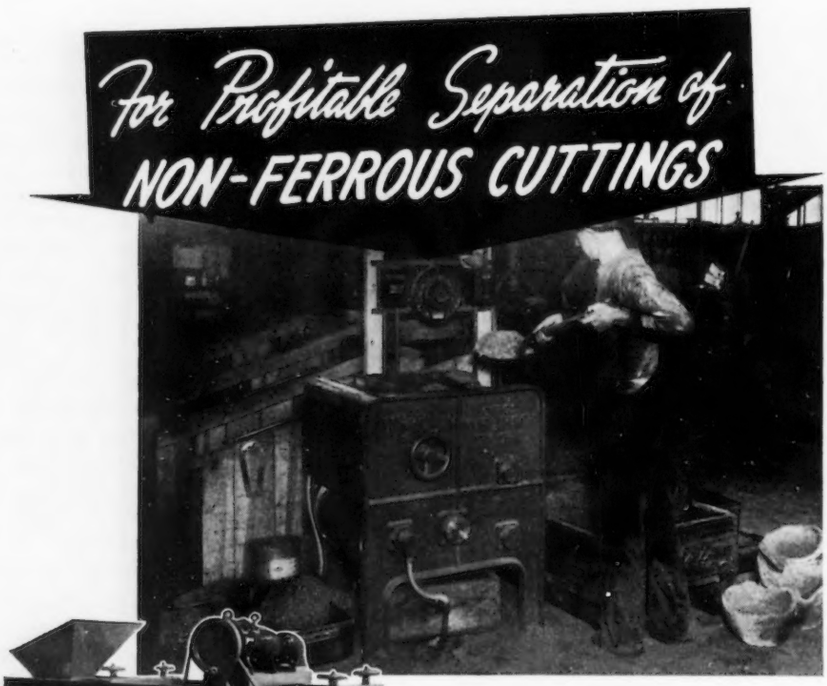
Sheet specifications at PITTSBURGH in the past week were slightly in excess of a week ago. Some mills are still accepting specifications against low priced commitments, although it is said cancellations on unspecified tonnages will be put through soon. Automobile companies have been placing business sparingly and the word is being passed around that they will place a heavier volume of specifications soon. Some mills hope to be in a position to book sheet and strip busines at the present published price within the near future but this desire must await clarification of the sheet situation after June 30.

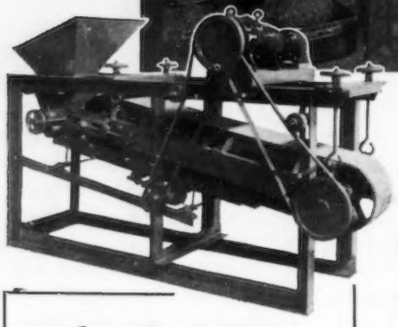
Depending entirely upon the degree to which schedules are filled for the remainder of the quarter, some CHICAGO sheet mills are receiving virtually no sheet specifications, while others are still taking

in business. In a few cases sheet orders can still be accepted for delivery before the announced deadline of June 30. Some producers are extending their deliveries over the deadline into July to take care of the overflow. Not a great deal of business is coming from automobile makers, who are understood to have on hand considerable quantities of 1940 cars still unsold. For this reason, the industry did not rush to take advantage of the $4 a ton concession on sheets for 1941 models.

At the start of this week at CLEVELAND only a small amount of space remained available for June shipment and this was chiefly for material not requiring much processing. Automotive parts makers have been specifying freely for initial 1941 model requirements.

By June 10, most sheet sellers in the NEW YORK area had received all the specifications on the low priced tonnages that they believe will be forthcoming. Opinions vary as to how long the period of waiting will be before fresh orders are issued. Estimates range from early July to the first of August, based on current consumer stocks and recent commitments.





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Bolts, Nuts and Rivets

. . . Automobile industry ordering for 1941 model production

Orders from the automotive industry for 1941 model requirements for June shipment are reported strong by CLEVELAND bolt and nut producers. Orders from other sources are improved noticeably also. Consumers apparently are anxious to maintain well balanced stocks and realize that prices are low in comparison to production costs. Demand on the Pacific Coast is reported better. The South is slow momentarily. In Middle Western agricultural regions the drop in grain prices has created uncertainty but an eventual upward spiral is considered inevitable. Orders from Canada are fairly good.

Tubular Goods

. . . Pipe demand only moderately ahead of a month ago

The tubular market at PITTSBURGH has been more or less unaffected by the activity in other steel markets and total bookings are only moderately ahead of a month ago. The lethargy in oil country goods springs from the knowledge that increased oil consumption can be taken care of by relaxation of production restrictions rather than wholesale drillings of new wells. Miscellaneous line pipe business continues fairly brisk and, paradoxically, prices are no firmer than they were a month ago.

Export sales, moderate orders for line pipe, and better jobber buying are noted at CLEVELAND and YOUNGSTOWN. Standard pipe is moving quickly in northern Ohio and jobbers are striving to maintain balanced stocks.

Merchant Bars

. . . Improvement in volume of orders continues

Domestic and foreign sales of hot rolled bars at PITTSBURGH in the past week were in greater volume than the week before and total bookings so far this month are running somewhat ahead of a month ago. While shell steel rounds are responsible for greatly expanded bar order books, it is also noted that domestic users are stepping up purchases and are adding to inventories.

At CLEVELAND and YOUNGSTOWN order volume of hot rolled carbon bars has shown improvement for the past several weeks. Backlogs contain large amounts of export business. Deliveries are becoming extended, particularly on 8-in. and 9-in. mills. Quicker shipments are obtainable on larger sizes. Some YOUNGSTOWN mills are reported particularly heavily engaged on export business.

In some CHICAGO sales offices merchant bars are the large tonnage items now being booked. Heavy demand has been seen recently from manufacturers of tractors, both for farm and industrial purposes, makers of agricultural implements in general, earth moving equipment, automotive parts, mills where bars are cold drawn, and steel warehouses. In some mills, bookings are in excess of production and backlogs are being built up.

The Inland Steel Co., Chicago, has revised its extra card as of June 1, 1940, on hot rolled carbon steel bars, an action recently taken by some other bar makers. The major changes apply a $1 a ton cutting extra on lengths of from 5 to 10 ft., whereas this formerly was base.

Tin Plate

. . . Operations edge upward to 74% . . . Some inventory buying

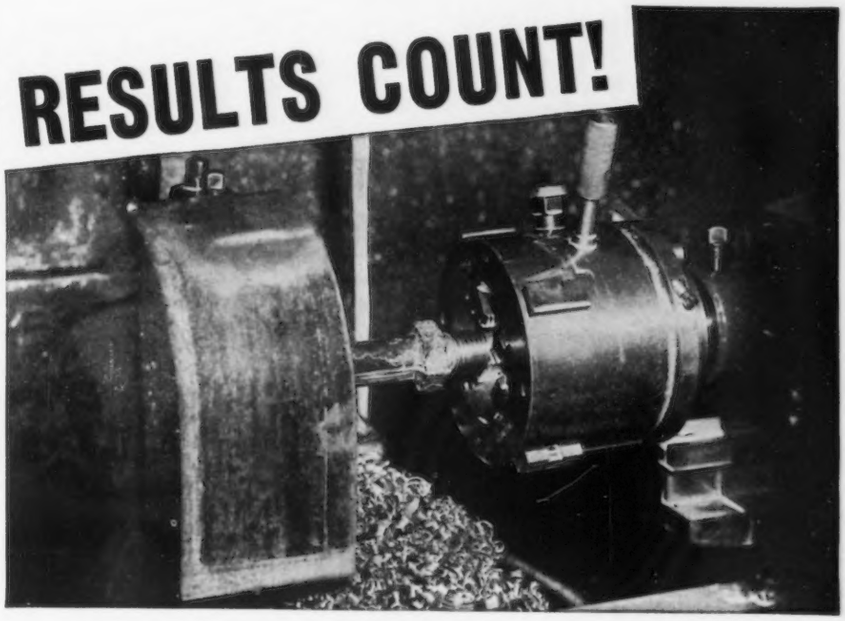
Tin plate operations are up one point this week to 74 per cent, total specifications have changed but little in volume in the past week, but releases against mill stocks from can makers are reaching large proportions. Before the end of this month it is expected that the drain on mill supplies for shipment against previously placed orders will about clean out mill stocks. Miscellaneous tin plate demand is expanding rapidly and inventory buying has become more or less general.

Demand for tin plate in CHICAGO is increasing week by week as the spring canning season proceeds. Export orders are also accounting for a share of the tin plate which is being produced there.

Wire Products

. . . Moderate pick-up in sales in rods and wire

Wire rod sales at PITTSBURGH in the past week have expanded due to a mild increase in domestic requirements and a better pickup in export orders. Some advances have been made in manufacturers' wire book-



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ings and consumers continue to take out previously booked nail tonnages.

Orders, production and shipments of all departments at CLEVELAND are strong. Releases against low price nail commitments are assisting production of merchant products. Export demand is described as improving. Bolt makers are ordering farther ahead than usual. Deliveries on small rod mills are becoming extended.

Jobbers of merchant wire products around CHICAGO have covered their requirements in advance for the next 30 to 60 days. New business consequently is not heavy now and is not expected to develop substantially for four to six weeks. Releases are good, however, and shipments strong.

FORGINGS offer . . . Reductions in Cost— Greater Strength— Longer Service Life

The manufacturer of Quincy Compressors states: "Several manufacturing economies are realized because of the lower machining cost, absence of breakage, less shafts rejected due to lack of uniformity. We also secure a reduction of weight through the use of a forged crankshaft." —*Excerpt from "Drop Forging Topics."*

The Reed-Prentice Portable Timber Saw contains a forged driving sprocket wheel and raker teeth, all of which must possess maximum toughness and stamina. They say: "We found that forgings could easily be made to the intricate shape required for this part (referring to raker teeth). This meant that only a minimum of stock had to be removed in order to completely finish the raker teeth to precision dimensions. The grain structure of the material is substantially improved in the forging operation." —*Excerpt from "Drop Forging Topics."*

Manufacturer of Coal Washing Machinery incorporates a forged eccentric shaft in their machines with highly successful results, and states: "By redesigning the shaft and forging it from SAE 1045 steel, we obtained ample strength and obviated the use of a larger size pitman bearing. Use of a forging for this shaft not only solved our problem of obtaining greater strength, but actually effected savings in fabrication costs which we had not anticipated."—*Excerpt from "Drop Forging Topics."*

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Reinforcing Bars

. . . Prices stiffening . . . Week's awards are 6700 tons

Sellers have notified district offices to accept no billet steel concrete bar business at less than 1.90c. a 100 lb. f.o.b. Pittsburgh. Further testing of this price level will be necessary before the trade can feel assured it will stick.

Reinforcing steel awards at 6700 tons include no letting of more than 900 tons. New reinforcing steel projects total 7250 tons, the largest inquiry calling for 1240 tons for the Grand Coulee Dam and pumping station at Odair, Wash.

Iron Ore

. . . 1940 movement on Lakes expected to exceed 55,000,000 tons

Estimates of the probable season movement of Lake Superior iron ore are being stepped up to between 55,000,000 and 60,000,000 tons, whereas a few weeks ago the consensus was lower. Leading sellers have booked heavy commitments and are operating many mines on a full five-day basis, which is considered the limit before overtime. The number of trips per vessel has been a little below average up to June 10, however.

Railroad Buying

. . . Great Northern orders 1000 box cars . . . Mobile & Ohio may buy

Freight car purchases in May, totaling 2081 cars, were the heaviest of any month thus far this year, *Railway Age* reports. Freight car purchases in April aggregated 1812 cars, and in May, 1939, amounted to 2051 cars. Locomotive purchases in May totaled 20 units, as compared with 50 in April and 51 in May, 1939.

Purchases in the first five months of the present year amounted to 6350 freight cars and 156 locomotives. In the comparable period of 1939 7753 freight cars and 144 locomotives were bought.

Current equipment buying by the railroads is light, but the continued upswing of carloadings

makes it probable that the roads will be required to do considerable new equipment buying or repair work in the near future. The growing tightness of steel supplies is a factor which will likely hasten this undertaking.

Great Northern has purchased 1000 box cars, awarding 500 to Pressed Steel Car Co. and 500 to Pullman-Standard Car Mfg. Co. Tennessee Coal, Iron & Railroad Co has ordered 10 gondolas from Pullman-Standard Car Mfg. Co. Seaboard Air Line is seeking prices on 18 passenger cars.

Recent export orders booked by Baldwin Locomotive Works include one for E. de F. de Goiaz, Brazil; two for Guayaquil & Quito, Ecuador, and four for Cia. Bananera de Costa Rica. Value of these orders is approximately $259,000.

Brazilian sources report a contract for 22,000 tons of rails has been awarded to Inland Steel Co. by a Brazilian road. Acceptance of this order has not been confirmed by the steel company.

Mobile & Ohio is seeking approval of expenditures totaling $3,265,000 for new equipment. The road proposes to buy 1000 box cars, 250 hopper bottom cars and two diesel passenger locomotives.

Export Trade

. . . Several hundred thousand tons of steel placed by Allies

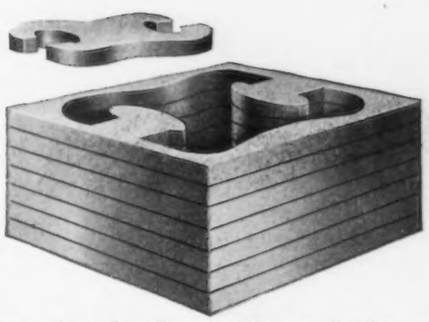
Purchases of steel in the United States for the Allies will henceforth be made by the Anglo-French Purchasing Board, 15 Broad Street, New York, according to an announcement by the commission. Such purchases were heretofore handled from London. This action follows the arrival a week or so ago of a delegation of British steel men.

Including the previously mentioned French steel inquiry of 140,000 tons, which covered a variety of products, total new business allocated by the Allied buying commission to American mills last week approximated between 600,000 and 700,000 tons, an exceptionally large part of which represented French shell steel. The orders, comprising both British and French requirements, were negotiated by the Anglo-French Purchasing Board. Obviously, Allied purchases in this country will represent an increasing greater amount of finished steel products owing to the break-down in French industrial operations as a result of recent war developments. Meanwhile, neutral countries continue to expand their requirements in the firm belief that supplies will be difficult to obtain in the near future.

During the past week, the Anglo-French Purchasing Board is said to have purchased 25,000 tons of plates for the French account. Owing to the fact that an important part of French steel producing plants are now in German hands, it is expected that the French will concentrate on the purchase here of finished steel rather than semi-finished as have the British since the war began.

DoALL DOES ITS STUFF IN ENGLAND

George P. Barrott writes from Banstead, Surrey, England:



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Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Industry Ready to Cooperate

Cleveland

• • • Despite the confusion caused by conflicting newspaper reports from Washington during the past week, capacity production continues here and the entire industry is keyed up to cooperate with the Government. Serious problems remain to be ironed out, including classification of priorities and centralization of control. Meanwhile, domestic buying from all industries is very strong. Overhanging the market is equipment desired by the machine tool industry itself which because of unavoidable delays in buying will have to be refitted into production schedules. Of all armament branches the Navy has shown greatest intent upon speed and reportedly already has stopped machine tools in transit. It appears likely pick-ups for rearmament will have to be made at docks or at factories of customers. On much of the export equipment, screws, dials and other parts will have to be changed from the metric basis.

During the past week the British purchased here well over 100 used machines. An aircraft parts manufacturer released considerable equipment. Considerable die work is being transferred to Detroit where capacity is now available temporarily. The shortage of machinists continues acute.

Export Still a Big Factor

Chicago

• • • Machine tool plants at Rockford, Beloit, Madison and Milwaukee, report that export business accounts for from 30 to 60 per cent of total bookings. In only one plant are many orders from Japan and Russia, almost all of the demand from abroad at other plants coming from England and France, although considerable machinery has been shipped to Japan and Russia in the recent past. Of the remaining business on the books, but little can be traced to sources uninspired by the war. Some plants have substantial Government orders which are destined for arsenals and Navy yards. Nearly every plant has received large orders recently from the aircraft industry. The automobile and tractor industries have also been active buyers in recent weeks.

With so much export business the machine tool executives interviewed are naturally concerned over the report, now known to have been false, that an embargo had been imposed upon the export of machine tools. It is being assumed by many of these men that Washington will allow British and French orders to be filled unless our own national needs appear greater. Russian and Japanese business will probably be cut off first if any such action is taken. Whether the Government, in its haste to secure machines for aircraft and other plants vital to the building up of American defense, will exercise prior rights and take what it wants, is uppermost in the minds of many builders.

Rumors were flying thick and fast last week about an embargo being applied by the State Department to machine tools destined for Japan. Restrictions are being applied, but it is much too early to say how far and to what extent. Suffice it to say that the cargo of the Japanese steamship *Azumasan Maru* was being checked all last week at New York. Certain machine tools, including lathes and millers, were withheld from shipment for the present at least. They represented only a small part of the total cargo. Rolling mill machinery, which has bulked large in Japanese imports from the United States this year (see table on page 65), was not suspended from shipment.

The cries that have gone up throughout the Middle West in recent weeks for more skilled labor have not been without reason. In only two of eight plants surveyed did the management appear satisfied with the labor supply. One of these, which alone employs over 2600 persons, has successfully trained and added to its staff hundreds of semi-skilled and unskilled men within the past six months.

Report No Export Ban

Cincinnati

• • • Machine tool men generally report that they are still shipping abroad and, so far as they are concerned, there has been no official action taken on a stoppage of the foreign business. Of course, the bulk of business now in this area is from the Allies, although some few orders for Russia and Japan are reported. Shipments to these latter two countries, however, have dwindled quite a bit since the delivery dates are so extended. Manufacturers further indicate that there has been no priority requests for rearmament programs, but that the market continues at the same even brisk pace that has been maintained for some months. New business during the current week is at the same active level as heretofore, except that users tend to shop more widely in the interests of early shipments.

Aircraft Plants Getting Priority

New York

• • • **Buying of machine** tools on the part of the two principal engine builders here in the East, Pratt & Whitney and Wright Aeronautical, has been tremendous in the past week, although both concerns have been expanding their capacity and installing new machinery since last September. Every effort is being made to give the aircraft engine builders and the parts makers priority on shipment, even to the extent of borrowing from machines on order from foreign customers. Representatives of Japanese agencies, for example, report that they have been informed of the diversion of such machines to the U. S. aircraft industry and frankly look to further delay in shipments for the next six months at least. There has also been some diversion of machine tools to the Navy, some machinery having been taken off a Japanese boat loading in New York last week.

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, June 11—Entry of Italy into the war had been generally expected by the non-ferrous trade and consequently the market showed little reaction to Monday's official proclamation. Domestic buying was in good volume throughout the past week, further aggravating the tight situation in both copper and zinc. This growing scarcity will quite likely prevent a repetition of sales as large as the 16,400 tons of copper which were reported sold last Thursday. This tightness has placed all first hand copper sellers firmly at 11.50c. per lb., Connecticut Valley. Premiums of up to 10 points over this were asked in the open market at the close of the week.

Italy has suspended shipment of copper on order here, amounting to about 7500 tons. This action is not expected to have any effect on quotations. Removal of Italy from the export market leaves only Japan, outside of the Allies, as an active buyer of copper here. Export inquiry thus far this week has been very light, with prices remaining in the neighborhood of 11.50c. f.a.s.

The heavy domestic buying lately probably reflects, in part, anticipation of heavy demands in connection with the rearmament program. Some fabricators are covered as much as six months' forward on the basis of full capacity operations.

Zinc

Prime Western sales in the past week were 12,280 tons, or almost double the preceding week's business. Shipments in the period were 4633 tons, against 6531 tons in the previous week. A portion of the heavier buying was no doubt due to the May statistics released during the week. These statistics showed shipments in May of 59,177 tons of slab metal, the highest monthly figure since November, 1939, and 12,200 tons over the April total. Stocks at the end of May were 75,036 tons, or a little more than a month's supply. Reserves at the close of April stood at 81,234 tons. Prices are strong at 6.25c. per lb., East St. Louis.

Lead

An active demand for July lead persisted throughout the past week and sellers experienced no difficulty in disposing of quotas. By the end of the week, June requirements were practically all bought, while July needs were about 55 per cent covered. Quotations are firm and unchanged at 4.85c. per lb., New York.

Tin

Entrance of Italy into the European war boosted prices here 1¼c. on Monday, although most sellers do not believe Italy capable of interfering with shipments from the East. Very little tin has moved through the Mediterranean in recent months. There was a good demand all during the week which, in face of the tightness in prompt and nearby metal, caused prices to advance almost daily. Today's price for nearby Straits is 57c. per lb., New York, as compared with 55c. a week ago.

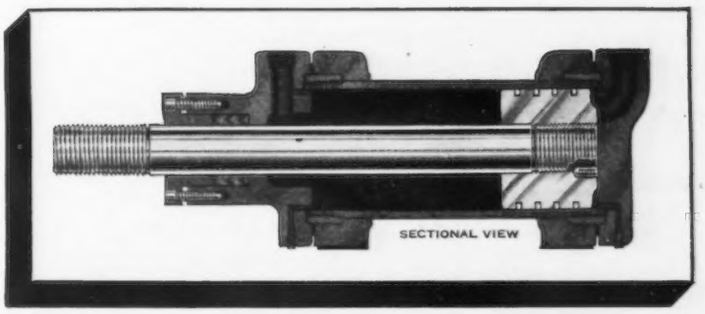
May Average Prices

The average prices of the major non-ferrous metals in May, based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley	11.50c.*
Lake copper, Eastern delivery	11.50c.
Straits tin, spot, New York	51.51c
Zinc, East St. Louis	5.81c.
Lead, New York	5.02c.
Lead, St. Louis	4.87c.
Zinc, New York	6.20c.

*Mine producers only.

Non-ferrous prices on page 107.



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HANNIFIN *hydraulic* **CYLINDERS**

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

• • • Gains of $1.25 in the average price of No. 1 steel at Pittsburgh and of 50c. at Philadelphia have raised the composite price to $19.17, up 59c. from last week and a gain of exactly $1 in the past fortnight. From the 1940 low point of $16.04 registered on April 9, the composite figure has gained almost half the loss from the October high point of $22.50. Lacking sales, Chicago prices are unchanged except on some specialties, but elsewhere great strength is exhibited. For the second week Youngstown prices have been advanced $1 and are now high enough to draw scrap from the Pittsburgh area. Gains of 50c. have been recorded at Cleveland and Buffalo. Dealer buying prices are higher in most centers.

Some boats were loading for Italy, but not much buying had been done against the recent Italian contract tonnages, so that the export market is little affected by Italy's entrance into the war. Dealer buying prices against British tonnages are higher in line with the upward trend in the composite price.

Pittsburgh

The market is exceptionally strong. On the basis of firm offers by consumers and sales into consumption, No. 1 heavy melting steel is quotable at $20 to $20.50, up $1.25 from last week's flat price of $19. Railroad heavy melting steel is quotable at $21.50 to $22, up $1 from a week ago. These prices, however, are nominal, pending higher priced sales. Specialties continue strong. Brokers are unwilling to sell short under any case as yard supplies here are fairly well depleted. Consumption of scrap bought on the open market continues somewhat less than in other districts nearby owing to factors previously mentioned. Material is still moving from this district to the Youngstown area, where demand is greater and higher prices are being obtained.

Chicago

No sales have been reported since that last week at $18. Brokers are paying dealers from $17.75 to $18 for heavy melting steel, with the higher figure general. Considerable tonnages of old material are moving from Chicago to Hamilton, Ont., stimulated by the new $3.50 freight rate. Steel, bundles, busheling and other grades are being sold in Canada at attractive prices. The market here is still in a state of confusion and uncertainty. Today's prices are largely nominal.

Philadelphia

Considerable confusion still exists as to the exact status of the market here, but there is little question that the upward movement has not yet spent itself. One district consumer in the past week paid $20 for No. 1 steel, while another was able to acquire a fairly substantial tonnage for $19. Brokers generally are paying $19.50 in covering on recent No. 1 business. No. 2 steel has been sold into consumption at $18.50. Little Italian scrap has been shipped from Port Richmond but there is a possibility of material collected at other points being offered to consumers in this area. This may act to restrain the upward movement of prices here.

Cleveland

Every indication here points to great strength. Open-hearth schedules are maintained at a high rate, and scrap is none too plentiful. Attractive offers are being received from other nearby districts. The local railroad steel commanded around $20.50. A small vessel cargo of $19 scrap arrived during the past week from Providence, and it is reported more will follow during the summer. Meanwhile a brisk movement is maintained by vessel from Detroit.

Youngstown

Scrap has been growing stronger during the past week, principally due to the rapid depletion of mill stocks as additional open hearth capacity was brought into use. The flow of scrap which seemed adequate June 3 was entirely below needs at the start of this week. No. 1 heavy melting is quoted up $1 a ton to a range of $20.50 to $21, amply supported by actual conditions. No. 2 steel has been exceptionally strong.

Buffalo

A sale, small in the light of present mill operations, of No. 2 heavy melting steel was made to a local consumer this week at a price which places the value of No. 1 steel within the range of $19 to $19.50. Another consumer is offering $19, but as yet has been unable to obtain material at that figure. Dealers look for yet stronger prices. Cast grades have slowed somewhat.

Cincinnati

The market undertone is generally strong and dealers have increased bids from 50c. to $1 on the whole list. Mills generally are accepting material on contract, but showing no great rush for any additional coverage. Dealers generally expect steadily increasing strength.

St. Louis

Brokers advanced their prices on scrap iron from 25c. to as much as $2.75 a ton. In a move to bring out more material from country dealers, who have been holding their stocks for higher prices expected because of war and the armament program of this country. An East Side mill bought several thousand tons of specialties. Mills are fairly well supplied, but dealers stocks are said to be low. Railroad lists: Louisville & Nashville, 6000 tons; Missouri Pacific, 1200 tons; Missouri-Kansas-Texas, 875 tons; Chicago & Eastern Illinois, 300 tons, and St. Louis-Southwestern, 250 tons.

Birmingham

Unable to determine what will occur from day to day, dealers are not offering scrap even at the present stiff prices which went into effect last week. Buyers are willing to buy almost any kind of scrap offered. The market is in the most unpredictable situation in some years.

New York

Italy's entry into the war leaves only one export customer for scrap that is active at present, namely the United Kingdom. The Japanese have been inactive for the past month. An Italian boat was here to take scrap, but loading was stopped last Saturday. Shipments to Great Britain are light. Material on barges has gone by canal to Buffalo and there is talk of shipments from here to Canada via the same route. Despite the inactivity, export buying prices are $1 higher than last week. Prices for scrap on cars are also much stronger.

Boston

The market is decidedly stronger and the movement for domestic consumption of steel turnings, blast furnace material and bundled scrap considerably more active than a fortnight ago because yards that accumulated supplies at lower than prevailing prices are inclined to lighten inventories. At Providence, Ford motor barges are loading automobile scrap free from alloy for Lake delivery. Exporters are paying more for Nos. 1 and 2 steel as well as stove plate. Two boats are loading here for England, one 7000 and the other 4700 tons. An Italian boat was loading 7200 tons prior to Italy's war action.

Toronto

Firmer prices developed in Canadian iron and steel scrap markets during the week, when dealers advanced prices on Nos. 1 and 2 heavy melting steel 25c. a ton. The remainder of the list was strong but unchanged. Local dealers look for heavy bookings for the coming three months. Large quantities of scrap are appearing on the market from Canadian dealers and no special shortage has developed. Recent price advances across the line lately have tended to slow down imports.

Detroit

With Detroit ingot production at 100 per cent of capacity, sentiment in scrap circles has been given another upward boost, but is still somewhat mixed. The wide spread in Detroit quotations continues and prices have temporarily leveled off, with the exception of bundles on which an advance of 75c. in the average price has been noted.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.00 to $20.50
Railroad heavy mltng.	21.50 to 22.00
No. 2 heavy melting..	18.50 to 19.00
Railroad scrap rails...	21.50 to 22.00
Rails 3 ft. and under..	24.50 to 25.00
Comp. sheet steel.....	20.00 to 20.50
Hand bundled sheets..	19.00 to 19.50
Heavy steel axle turn.	19.00 to 19.50
Machine shop turnings	14.00 to 14.50
Short shov. turnings..	15.50 to 16.00
Mixed bor. & turn.....	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Cast iron carwheels...	20.50 to 21.00
Heavy breakable cast.	16.50 to 17.00
No. 1 cupola cast.....	20.00 to 20.50
RR. knuckles & coup..	25.00 to 25.50
Rail coil springs	25.00 to 25.50
Rail leaf springs	25.00 to 25.50
Rolled steel wheels....	25.00 to 25.50
Low phos. billet crops.	25.00 to 26.00
Low phos. punching...	24.50 to 25.00
Low phos. heavy plate.	22.50 to 23.00
Railroad malleable ...	23.50 to 24.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$19.00 to $20.00
No. 2 hvy. mltng. steel.	18.50
Hydraulic bund., new.	19.00 to 20.00
Hydraulic bund., old..	16.50
Steel rails for rolling..	**20.50 to 21.00**
Cast iron carwheels...	**20.50 to 21.00**
Hvy. breakable cast...	20.50
No. 1 cupola cast.....	20.50 to 21.00
Mixed yard (f'd'y) cast	18.00 to 18.50
Stove plate (steel wks.)	16.00 to 16.50
Railroad malleable	22.00 to 22.50
Machine shop turn....	13.00 to 13.50
No. 1 blast furnace....	11.50 to 12.00
Cast borings	11.50 to 12.00
Heavy axle turnings..	14.50 to 15.00
No. 1 low phos. hvy...	23.50 to 24.00
Couplers & knuckles..	23.50 to 24.00
Rolled steel wheels....	23.50 to 24.00
Steel axles	**22.50 to 23.00**
Shafting	24.00 to 24.50
Spec. iron & steel pipe	16.50 to 17.00
Cast borings (chem.)..	**14.00 to 14.50**

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel.....	$17.50 to $18.00
Auto. hvy. mltng. steel alloy free	16.50 to 17.00
No. 2 auto steel	14.25 to 14.75
Shoveling steel	17.50 to 18.00
Factory bundles	17.00 to 17.50
Dealers' bundles	15.50 to 16.00
No. 1 busheling	16.50 to 17.00
No. 2 busheling, old...	8.00 to 8.50
Rolled carwheels	19.50 to 20.00
Railroad tires, cut	20.00 to 20.50
Railroad leaf springs..	19.00 to 19.50
Steel coup. & knuckles.	19.50 to 20.00
Axle turnings	15.50 to 15.75
Coil springs	20.50 to 21.00
Axle turn. (elec.).....	16.50 to 17.00
Low phos. punchings..	19.00 to 19.50
Low phos. plates 12 in. and under	19.50 to 20.00
Cast iron borings.....	11.25 to 11.75
Short shov. turn.	12.50 to 13.00
Machine shop turn....	12.00 to 12.50
Rerolling rails	21.50 to 22.00
Steel rails under 3 ft..	19.75 to 20.25
Steel rails under 2 ft..	22.00 to 22.50
Angle bars steel	20.00 to 20.50
Cast iron carwheels...	18.75 to 19.25
Railroad malleable	21.50 to 22.00
Agric. malleable	14.75 to 15.25
	Per Net Ton
Iron car axles	23.50 to 24.00
Steel car axles	22.50 to 23.00
Locomotive tires	15.00 to 15.50
Pipes and flues	11.50 to 12.00
No. 1 machinery cast.	16.75 to 17.25
Clean auto. blocks....	18.00 to 18.50
No. 1 railroad cast.....	15.00 to 15.50
No. 1 agric. cast.....	13.50 to 14.00
Stove plate	12.00 to 12.50
Grate bars	12.50 to 13.00
Brake shoes	13.00 to 13.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng steel.	$20.50 to $21.00
No. 2 hvy. mltng. steel.	20.00 to 20.50
Low phos. plate	22.00 to 22.50
No. 1 busheling	19.25 to 19.75
Hydraulic bundles	20.00 to 20.50
Machine shop turn.....	12.50 to 13.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$19.00 to $19.50
No. 2 hvy. mltng. steel.	18.00 to 18.50
Comp. sheet steel.....	$18.50 to $19.00
Light bund. stampings	15.00 to 15.50
Drop forge flashings...	17.75 to 18.25
Machine shop turn....	11.50 to 12.00
Short shov. turn.....	12.00 to 12.50
No. 1 busheling	18.25 to 18.75
Steel axle turnings....	17.50 to 18.00
Low phos. billet and bloom crops	23.00 to 23.50
Cast iron borings.....	12.00 to 12.50
Mixed bor. & turn.....	12.00 to 12.50
No. 2 busheling	12.00 to 12.50
No. 1 cupola cast.....	21.50 to 22.00
Railroad grate bars...	**14.25 to 14.75**
Stove plate	**14.25 to 14.75**
Rails under 3 ft.	23.00 to 23.50
Rails for rolling	21.00 to 21.50
Railroad malleable ...	22.00 to 22.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$19.00 to $19.50
No. 2 hvy. mltng. steel.	17.00 to 17.50
Scrap rails	21.00 to 21.50
New hvy. b'ndled sheets.	17.00 to 17.50
Old hydraul. bundles..	15.00 to 15.50
Drop forge flashings..	17.00 to 17.50
No. 1 busheling	17.00 to 17.50
Machine shop turn....	**11.50 to 12.50**
Shov. turnings	**12.50 to 13.00**
Mixed bor. & turn.....	11.00 to 11.50
Cast iron borings	11.00 to 11.50
Knuckles & couplers..	21.50 to 22.00
Coil & leaf springs....	21.50 to 22.00
Rolled steel wheels....	21.50 to 22.00
No. 1 machinery cast.	20.00 to 20.50
No. 1 cupola cast	18.50 to 19.00
Stove plate	14.50 to 15.00
Steel rails under 3 ft...	23.00 to 23.50
Cast iron carwheels...	18.50 to 19.00
Railroad malleable ...	21.50 to 22.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$16.50 to $17.00
No. 1 hvy. melting.....	16.00 to 16.50
No. 2 hvy. melting....	15.50 to 16.00
No. 1 locomotive tires.	19.00 to 19.50
Misc. stand. sec. rails.	19.00 to 19.50
Railroad springs	19.00 to 19.50
Bundled sheets	11.00 to 11.50
Cast bor. & turn.....	7.00 to 7.50
Machine shop turn.....	8.00 to 8.50
Heavy turnings	12.00 to 12.50
Rails for rolling	21.00 to 21.50
Steel car axles	21.50 to 22.00
No. 1 RR. wrought....	14.00 to 14.50
No. 2 RR. wrought....	15.00 to 15.50
Steel rails under 3 ft...	21.75 to 22.25
Steel angle bars	**18.00 to 18.50**
Cast iron carwheels...	16.50 to 17.00
No. 1 machinery cast..	18.75 to 19.25
Railroad malleable ...	18.50 to 19.00
Breakable cast	16.00 to 16.50
Stove plate	12.50 to 13.00
Grate bars	10.50 to 11.00
Brake shoes	12.00 to 12.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$15.00 to $15.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Scrap rails for mltng..	20.50 to 21.00
Loose sheet clippings..	9.75 to 10.25
Hydrau. b'ndled sheets	14.25 to 14.75
Cast iron borings	6.50 to 7.00
Machine shop turn.....	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 2 busheling	5.25 to 5.75
Rails for rolling.....	22.00 to 22.50
No. 1 locomotive tires.	16.50 to 17.00
Short rails	22.50 to 23.00
Cast iron carwheels...	16.50 to 17.00
No. 1 machinery cast..	19.00 to 19.50
No. 1 railroad cast	17.50 to 18.00
Burnt cast	11.00 to 11.50
Stove plates	11.00 to 11.50
Agricul. malleable	15.50 to 16.00
Railroad malleable ...	18.50 to 19.00
Mixed hvy. cast	16.25 to 16.75

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$16.00
No. 2 hvy. melting steel	15.00
No. 1 busheling	14.00
Scrap steel rails	15.00
Steel rails under 3 ft...	16.00
Rails for rolling	16.50
Long turnings	5.00
Cast iron borings	7.50
Stove plate	10.00
Steel axles	18.00
No. 1 RR wrought....	14.00
No. 1 cast	16.00
No. 2 cast	12.50
Cast iron carwheels...	13.00
Steel car wheels	16.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting...	$16.00 to $17.00
No. 2 heavy melting...	15.00 to 16.00
Borings and turnings..	10.00 to 11.00
Long turnings	10.25 to 11.00
Short shov. turnings..	11.00 to 11.50
No. 1 cast	19.00 to 20.00
Automotive cast	19.00 to 20.00
Hvy. breakable cast...	15.50 to 17.00
Stove plate	12.50 to 13.00
Hydraul. Comp. sheets	17.50 to 18.00
New busheling	15.50 to 16.50
Sheet clips	13.00 to 14.50
Flashings	15.00 to 16.00
Low phos. plate	17.50 to 18.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$15.00 to $15.50
No. 2 hvy. mltng. steel.	14.00 to 14.50
Hvy. breakable cast...	15.50 to 16.00
No. 1 machinery cast..	17.50 to 18.00
No. 2 cast	14.50 to 15.00
Stove plate	12.00 to 12.50
Steel car axles	19.50 to 20.50
Shafting	19.50 to 20.50
No. 1 RR. wrought....	14.50 to 15.50
No. 1 wrought long....	13.00 to 13.50
Spec. iron & steel pipe	11.50 to 12.00
Rails for rolling	16.00 to 16.50
Clean steel turnings*..	8.00 to 8.50
Cast borings*	7.00 to 7.50
No. 1 blast furnace....	7.00 to 7.50
Cast borings (chem.)..	10.00 to 11.00
Unprepared yard scrap	9.00 to 9.50
Light iron	7.00 to 7.50

Per gross ton delivered local foundries:

No. 1 machin. cast.....	$18.00 to $19.00
No. 2 cast	17.00 to 17.50

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$14.50 to $14.75
Machine shop turn.....	7.15 to 7.65
Mixed bor. & turn.....	5.50 to 6.15
Bun. skeleton long.....	10.50 to 11.00
Shafting	18.00 to 18.50
Stove plate	11.00 to 11.25
Cast bor. chemical	8.50 to 9.00

Per gross ton delivered consumers' yards:

Textile cast	**$15.50 to $17.00**
No. 1 machine cast....	**15.50 to 17.00**

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel.	$14.00 to $14.25
No. 2 steel	13.00 to 13.25

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	$12.00	$12.00	$11.00
No. 2 hvy. mltng. steel	11.00	11.00	10.00
Bundles	10.00	10.00	9.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel.....	$11.50	$11.00
No. 1 hvy. mltng. steel.	11.25	10.75
No. 2 hvy. mltng. steel.	10.00	9.50
Mixed dealers steel...	8.75	8.25
Drop forge flashings...	9.75	9.25
New loose clippings...	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	14.00	13.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel.	$15.00 to $15.50
No. 2 hvy. mltng. steel.	13.00 to 13.50
No. 2 cast	13.50 to 14.00
Stove plate	11.75 to 12.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.	$15.50 to $15.75
No. 2 hvy. mltng. steel.	14.00 to 14.25
Rail (scrap)	15.50 to 16.00
Stove plate	11.75 to 12.00
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel.....	$17.75
No. 2 hvy. mltng. steel.....	16.25

Construction Steel

. . .STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings slightly higher at 17,550 tons against 16,600 tons last week; new projects advance to 28,925 tons from 10,100 tons; plate awards call for 1345 tons.

AWARDS

NORTH ATLANTIC STATES

1500 Tons, New York, Cardinal Hayes Memorial High School in Bronx, to American Bridge Co., Pittsburgh.

818 Tons, Confluence, Pa., Youghiogheny Dam, to Youngstown Car & Foundry Co., Youngstown, Ohio.

375 Tons, Erie, Pa., State bridge over New York Central Railroad, to Bethlehem Steel Co., Bethlehem, Pa.

295 Tons, Bridgeport, Conn., Bullard Co. foundry addition, to Lehigh Structural Steel Co., Allentown, Pa.

280 Tons, Baltic, Conn., State bridge over Shetucket River, to American Bridge Co., Pittsburgh.

230 Tons, Bennington, Vt., State bridge, to Bethlehem Steel Co., Bethlehem, Pa.

230 Tons, Warwick, R. I., State bridge No. 367, to Bethlehem Steel Co., Bethlehem, Pa.

200 Tons, Orange County, N. Y., State highway bridge FABC-40-25, to American Bridge Co., Pittsburgh.

175 Tons, Gardner, Mass., building addition for Florence Oil Stove Co., to Haarman Steel Co., Holyoke, Mass.

170 Tons, Wilkes-Barre, Pa., five pumping stations for Government, to Pine Brook Iron Works, Scranton, Pa.

155 Tons, Hardwick, Mass., Gilbertville bridge, to Phoenix Bridge Co., Phoenixville, Pa.

140 Tons, Pawtucket, R. I., United Electric Railroad garage extension, to American Bridge Co., Pittsburgh.

120 Tons, Fieldmore Springs, Pa., State highway bridges, to American Bridge Co., Pittsburgh.

100 Tons, Chester, Pa., Lamokin Village housing project, to Belmont Iron Works, Philadelphia.

SOUTH AND SOUTHWEST

1635 Tons, Gravelly Point, Va., terminal building and hangar for Government, to Virginia Bridge Co., Roanoke, Va.

1500 Tons, Jacksonville, Fla., assembly and repair shop for Navy Department, to Jones & Laughlin Steel Corp., Pittsburgh.

450 Tons, Power, W. Va., power house alterations for West Penn Power Co., to Fort Pitt Bridge Works Co., Pittsburgh.

425 Tons, Windsor, W. Va., boiler house unit No. 8, to Fort Pitt Bridge Works Co., Pittsburgh.

355 Tons, Cotton County, Okla., State highway bridge, to Patterson Steel Co., Tulsa, Okla.

260 Tons, Douglas, Ariz., converter building extensions for Phelps Dodge Corp., to Kansas City Structural Steel Co., Kansas City, Kan.

165 Tons, Lowndes and Brooks Counties, Ga., and Madison County, Fla., bridge FAS-201A, to Vincennes Bridge Co., Vincennes, Ind.

150 Tons, Wheeler Dam, Ala., trash racks, to Lakeside Bridge & Steel Co., Milwaukee.

130 Tons, Quitman, Ga., bridge, to Virginia Bridge Co., Roanoke, Va.

CENTRAL STATES

380 Tons, Hutsonville, Ill., power house, Central Illinois Public Service Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.

300 Tons, Orient, Ill., coal handling plant, to Vincennes Bridge Co., Vincennes, Ind.

260 Tons, Warren, Ohio, power house alterations and bunker for Ohio Public Service Co., to American Bridge Co., Pittsburgh.

200 Tons, Detroit, factory building for American Metal Products Co., to Bethlehem Steel Co., Bethlehem, Pa.

153 Tons, Conneaut, Ohio, County bridge, project No. 46, to Fort Pitt Bridge Works Co., Cleveland, through National Construction Co., Cleveland.

141 Tons, Peoria, Ill., service building, Caterpillar Tractor Co. to Joseph T. Ryerson & Son, Inc., Chicago.

WESTERN STATES

5000 Tons, Sitka and Kodiak, Alaska, Naval air and fleet bases, to Columbia Steel Co., San Francisco, through Seims-Drake-Puget Sount, Seattle, contractors.

550 Tons, Montana, Washington and North Dakota bridges for Great Northern Railway, to American Bridge Co., Pittsburgh.

350 Tons, Chittenden, Cal., Southern Pacific Railroad bridge, to Columbia Steel Co., San Francisco.

220 Tons, Cody, Wyo., bridge for Bureau of Public Roads, to Bethlehem Steel Co., Bethlehem, Pa.

106 Tons, Zurich, Mont., bridge to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

8000 Tons, Brooklyn, Atlantic Avenue improvement, sections 3 and 4, for Long Island Railroad Co.

1900 Tons, Caldwell Township, N. J., boiler house, factory and office building for Curtiss-Wright Corp.

900 Tons, Highland, Pa., State bridge.

540 Tons, New York, Tuberculosis Hospital for Riverside Hospital.

520 Tons, New York, building addition for St. Vincent Hospital.

365 Tons, Wilton, Conn., State grade crossing elimination.

310 Tons, West Lynn, Mass., extensions to building No. 57 for General Electric Co.

300 Tons, Lowell, Mass., State bridges.

229 Tons, Otsego County, railroad crossing elimination, projects R.C. 40-45 and 40-46.

220 Tons, Binghamton, N. Y., power plant building No. 60 for State.

165 Tons, Sharon, Pa., salvage building for Westinghouse Electric & Mfg. Co.

163 Tons, Addison, N. Y., highway bridge, project F.A.R.C. 40-51.

140 Tons, Hornell, N. Y., reconstruction, Bennett Street bridge.

130 Tons, Long Island, N. Y., grade crossing elimination for Long Island Railroad Co.

120 Tons, Neville Island, Pa., bear trap repair parts, locks Nos. 12 and 13, for U. S. Engineers' Office.

110 Tons, Danby, N. Y., highway bridges, project F.A.R.C. 40-50.

100 Tons, Petersham, Mass., Shaler Hall and Fisher Museum.

SOUTH AND SOUTHWEST

530 Tons, Waynesboro, Va., warehouse and making-up building for Crompton-Shenandoah Co.

380 Tons, Safford, Ariz., State bridge.

330 Tons, Wheeling, W. Va., Sears-Roebuck store building for Hazlett Estate.

270 Tons, Marion County, W. Va., State bridge.

CENTRAL STATES

4000 Tons, Dayton, Ohio, two buildings at Patterson Aviation Field.

3500 Tons, Peoria, Ill., Harvard Street bridge superstructure; bids by State Highway Commission, Springfield, June 21.

1200 Tons, Franklin Park, Ill., bridge over Milwaukee road yards; bids by State Highway Commission, Springfield, June 21.

450 Tons, Chicago, Sears-Roebuck & Co. warehouse.

350 Tons, State of Indiana, three bridges; bids by State Highway Commission, Bloomington, Ind., June 18.

350 Tons, Powerton, Ill., State bridge.

330 Tons, St. Marys, Ohio, factory building addition for Goodyear Tire & Rubber Co.

210 Tons, Cincinnati, truck terminal and warehouse for American Terminal Co.

200 Tons, St. Louis, overpass at Missouri Pacific tracks and Gravois Avenue; G. L. Tarlton Co., St. Louis, contractor.

130 Tons, Spearfish, S. D., State bridges.

125 Tons, Pearl City, Ill., State bridge.

WESTERN STATES

2000 Tons, Alameda, Cal., four hangars at Naval Air Station (Specification 9185); bids June 19.

1800 Tons, Oakland, Cal., four fleet supply storehouses at Naval Supply Base (Specification 9795); N. P. Severin Co., Chicago, general contractor (previously reported).

700 Tons, Berkeley, Cal., administration building for University of California; bids June 20 (previously reported).

284 Tons, Sappho, Wash., two bridges over Soleduck River on State highway 9; bids June 18.

270 Tons, Butte, Mont., converter plant for Anaconda Copper Mining Co.

FABRICATED PLATES

AWARDS

760 Tons, Baltimore, three tanks for Sinclair Refining Co., to Chidago Bridge & Iron Co., Chicago.

215 Tons, Westport, N. Y., 32-in. pipe for Wadhams & Westport Power & Light Co. to Alco Products Co., Dunkirk, N. Y.

370 Tons, Earp, Cal., floating bulkhead gate for spillway, Parker Dam, to American Bridge Co., Pittsburgh.

Weekly Bookings of Construction Steel

Week Ended ——→	June 11, 1940	June 4, 1940	May 14, 1940	June 13, 1939	Year to Date 1940	Year to Date 1939
Fabricated structural steel awards	17,550	16,600	22,250	17,500	344,830	453,525
Fabricated plate awards	1,345	5,005	1,920	14,580	69,385	89,380
Steel sheet piling awards	0	0	425	3,325	16,540	26,505
Reinforcing bar awards	6,700	9,450	7,050	7,000	190,750	218,345
Total Letting of Construction Steel	25,595	31,055	31,645	42,405	621,505	787,755

PENDING PROJECTS

5890 **Tons,** Los Angeles, Burbank-Santa Monica distribution line of Metropolitan Water District (Specification 333, Alternate SC); bids June 25. Reinforced concrete and cast iron alternates are provided on parts of this line.

1000 **Tons,** Boston, Metropolitan District Commission, water division.

SHEET PILING

PENDING PROJECTS

1500 **Tons,** Peoria, Ill., Harvard Street bridge; bids by State Highway Commission, Springfield, June 21.

Reinforcing Steel

Awards of 6700 tons; 7250 tons in new projects

AWARDS

ATLANTIC STATES

900 **Tons,** Jersey City, N. J., housing project, to Truscon Steel Co., Youngstown, Ohio.

400 **Tons,** Pawtucket, R. I., stadium, to Bethlehem Steel Co., Bethlehem, Pa.; J. J. McHale & Sons, Inc., Pawtucket, contractor.

375 **Tons,** Fairfield, Conn., highway project, to American Steel & Wire Co., Cleveland, through Osborn & Barnes, contractors. This was incorrectly reported awarded to Truscon Steel Co. in the May 23rd issue.

370 **Tons,** North Adams, Mass., grade crossing, to Carnegie-Illinois Steel Corp., Pittsburgh; C. Bianchi & Sons, Inc., Framingham, Mass., contractor.

350 **Tons,** New Bedford, Mass., housing project to Northern Steel Co., Boston. D'Amore Construction Co., Boston, contractor.

290 **Tons,** East Hartford, Conn., United Aircraft Corp. plant, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Boston, contractor.

250 **Tons,** Bayonne, N. Y., stills for Tidewater Oil Co., to Bethlehem Steel Co., Bethlehem, Pa., through E. B. Badger & Sons, contractor.

200 **Tons,** Bridgeport, Conn., filtration plant, to an unnamed bidder.

200 **Tons,** Cattaraugas County, N. Y., road project, to American Steel & Wire Co., Cleveland, through Holmes & Murphy Co., contractor.

150 **Tons,** Frederick, Md., Lincoln Apartments housing, to Bethlehem Steel Co., Bethlehem, Pa., through Sofarelli Bros., contractors.

125 **Tons,** Fairfield, Conn., highway project, to American Steel & Wire Co., Cleveland, through New Haven Road Construction Co., New Haven, Conn., contractor.

110 **Tons,** Wilmington, Del., office building for Du Pont Co., to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., contractor.

SOUTH AND CENTRAL

500 **Tons,** Birmingham, Southtown housing, to Ceco Products Co.

460 **Tons,** Conneaut, Ohio, County bridge, to Carnegie-Illinois Steel Corp., Pittsburgh, through National Construction Co., Cleveland.

450 **Tons,** Chicago, park board public bid opening June 4, to Calumet Steel Co.

350 **Tons,** Chicago, subway section S10A, to Joseph T. Ryerson & Son, Inc., Chicago, through A. J. Forschner, contractor.

346 **Tons,** Cleveland, Sears, Roebuck & Co., addition, to Patterson-Leitch Co., Cleveland, through Albert M. Higley Co.

341 **Tons,** N. Kansas City, Kan., Procurement Invitation No. 5665; public bid to Sheffield Steel Co., Kansas City.

200 **Tons,** Greenwood County, Kan., bridges, to Sheffield Steel Co., Kansas City.

200 **Tons,** Ohio, bars and mats for State highways projects, to Truscon Steel Co., Youngstown, through Holmes Construction Co., Wooster, Ohio.

200 **Tons,** Chicago, Albert Schwill granary, to Truscon Steel Co., Youngstown, Ohio.

160 **Tons,** Atlanta, Ga., Bankers Health Building, to Truscon Steel Co., Youngstown, Ohio.

125 **Tons,** Medicine Lodge, Kan., bridge, to Sheffield Steel Co., Kansas City.

PENDING REINFORCING STEEL PROJECTS

ATLANTIC STATES

600 **Tons,** Corning, N. Y., flood-control, U. S. Engineers; bids June 21.

500 **Tons,** Hartford, Conn., building for National Fire Insurance Co.; George A. Fuller, contractor.

400 **Tons,** Deer Park, N. Y., infirmary building.

390 **Tons,** York, Pa., flood control project, U. S. Engineers; bids July 9.

350 **Tons,** New York, Hutchinson River Parkway (H-10); Del Balso Construction Corp., low bidder.

300 **Tons,** New York, Catholic High School for boys; George A. Fuller, contractor.

240 **Tons,** Newark, N. Y., highway project F.A.R.C. 40-48.

160 **Tons,** Birmingham, N. Y., flood-control, U. S. Engineers. Bids due June 17.

110 **Tons,** Danby, N. Y., highway project F.A.R.C. 40-50.

100 **Tons,** Wheatland, N. Y., highway project F.A.R.C. 40-43.

100 **Tons,** Horseheads, N. Y., highway project F.A.R.C. 40-42.

100 **Tons,** Otsego County, N. Y., highway projects R.C. 40-45 and R.C. 40-46.

CENTRAL STATES

450 **Tons,** Chicago, subway section S9-C; bids June 20.

400 **Tons,** St. Louis, overpass at Missouri Pacific tracks and Gravois Avenue; G. L. Tarlton Co., St. Louis, contractor.

250 **Tons,** Peoria Ill. substructure bridge section 15-B; bids June 21.

160 **Tons,** Louisville, Ky., Buckeye Cotton Oil Co. plant.

WESTERN STATES

1240 **Tons,** Odair, Wash., Grand Coulee Dam and pumping plant, 990 tons (Invitation B-38, 318-B), 250 tons (Invitation B-38, 314-A); bids June 14.

912 **Tons,** Los Angeles, Burbank-Santa Monica distribution line of Metropolitan Water District (Specification 333, Schedule 31, Alternate P); bids June 25.

500 **Tons,** Oakland, Cal., Albers Brothers grain elevator.

104 **Tons,** Sappho, Wash., two bridges over Soleduck River on State highway 9; bids June 18.

100 **Tons,** Oakland, Cal., Piedmont Avenue School; P. Sartorio, San Francisco, contractor.

CANAL ZONE

182 **Tons,** Panama Canal Zone, schedule No. 4100; bids June 10.

Pipe Lines

Manville Crude Oil Co., Manville (Niobrara County), Wyo., plans new welded steel pipe line from Lance Creek, Wyo., oil field to Newcastle (Weston County) for crude oil transmission. Cost over $100,000 with booster pumping stations and other facilities.

Public Works Officer, Naval Operating Base, Norfolk, Va., closes bids June 21 for pipe line for pressure steam service to Unit V at local air station, including pipe, fittings, valves, expansion joints, pipe insulation, etc. (Specification 9861).

White & Mitchell, Meadville, Pa., H. Faber White, head, plan steel pipe lines in connection with development of new natural gas wells in Crawford County, near Cambridge Springs, Pa., including pipe line gathering system.

Santa Rosa, Cal., has let contract to Harvey Conner, 1222 Whipple Street, Redwood City, Cal., for 6, 8 and 12-in. steel pipe lines for main water system, at $50,851.90, including several lateral connections.

Manufacturers Light & Heat Co., Manufacturers Gas Co., and Pennsylvania Fuel Supply Co., affiliated interests, all with offices in Union Trust Building, Pittsburgh, have let contract to Williams Brothers Corp., National Bank of Tulsa Building, Tulsa, Okla., for welded steel pipe line, 8, 10 and 16-in., from point near Monaca, Pa., to vicinity of Knapp Creek, Cattaraugus County, N. Y., for natural gas transmission. At Monaca, line will connect with pipe line from West Virginia gas field, source of supply, operated by United Gas Fuel Co., Charleston, W. Va., and at terminus with connecting lines to Binghamton, Olean, N. Y., and vicinity, where distribution will be carried out by local utilities. Cost about $1,787,000. Pipe will be furnished by companies, which have placed orders with several manufacturers, as previously noted in these columns. All utility companies mentioned are interests of Columbia Gas & Electric Corp., 61 Broadway, New York.

McAllen, Tex., will take bids about Aug. 1 for steel pipe line system for municipal natural gas distribution, comprising about two miles of 4-in. and three miles of 2-in., with meter station and other facilities. Garrett Engineering Co., 910 Richmond Road, Houston, Tex., is consulting engineer.

Quartermaster, Construction Division, Washington, has let contract to Aqua Systems, Inc., 2443 Third Avenue, New York, at $127,960 for new pipe line gasoline fueling system for hangars at Hickam Field, T. H.

C. Andrade III, Tower Petroleum Building, Houston, Tex., oil operator, is installing new 6-in. steel pipe line gathering system in Wade City, Tex., oil field area, connecting with main pipe line for crude oil transmission in Jim Wells County, about 40 miles in all.

Metropolitan Water District, Los Angeles, asks bids June 25 for building 16-mile distribution line of Colorado River Aqueduct from Burbank to Santa Monica (Specification 333). Alternate bids will be taken as follows: Schedule 31, 5.8 miles, lock-joint steel cylinder reinforced precast concrete pipe, welded steel pipe; Schedule 32, 4.8 miles, welded steel pipe, cast iron pipe; Schedule 33, 5.4 miles, welded steel pipe, cast iron pipe.

Long Beach, Cal., has taken bids on 287 tons of seamless pipe, various lengths and sizes for gas department.

Cast Iron Pipe

Gardner, Mass., is in the market for 125 tons of 6 to 12-in. pipe.

Swampscott, Mass., will close bids this week on about 155 tons of 6 and 12-in. pipe.

Boston is taking bids on 3000 ft. of 8-in. spun pipe. It is the first time city has asked bids on such pipe.

Oakville, Conn., has plans for a water supply system. Bronson E. Lockwood, Litchfield Road, Watertown, Conn., is engineer.

Charlton, Mass., contemplates one and one-half miles of 6 and 8-in. water mains, standpipe and pumping station to cost about $80,000.

Spencer, Wis., closes bids June 21 for 300 ft. of 8-in., 13,655 ft. of 6-in., 1915 ft. of 4-in., and 3380 ft. of 2-in. for water system; also for about 15,000 lb. of specials, gate valves, water meters, etc. Frank J. Davy & Son, La Crosse, Wis., are consulting engineers.

What Cheer, Iowa, is arranging bond issue, to be voted at election on June 21, for pipe lines for water system and other waterworks installation. Cost about $40,000. Part of financing will be arranged through Federal aid.

Boonville, N. C., has plans for pipe lines for water system and other waterworks installation, including 75,000-gal. elevated steel tank and tower, and pumping station. Fund of $72,873 has been arranged for this and sewage disposal plant, of which $30,000 will represent a bond issue, recently voted, and remainder secured through Federal aid.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., plans pipe line extensions in water system in districts Nos. 1611, 1616 and 1617, recently created.

Vermont, Ill., plans pipe lines for water system and other waterworks installation. Cost about $240,000, to be secured through Federal aid and bond issue.

Rib Lake, Wis., will receive bids until June 18 for 4825 ft. of 6-in. pipe for water system for fire protection (Contract 2); also for valves and hydrants (Contract 3). A. E. McMahon Engineering Co., 124 Main Street, Menasha, Wis., is consulting engineer.

Waverly, Mo., closes bids June 17 for 200 ft. of 6-in. pipe, 15,600 ft. of 4-in., and 5100 ft. of 2-in. for water system; also for 75,000-gal. elevated steel tank and tower, valves, fittings, etc. Harrington & Cortelyou, Dwight Building, Kansas City, Mo., are consulting engineers. Fund of about $100,000 has been arranged for water and sewer systems, latter to be built later.

Argos, Ind., plans pipe line extensions in water system, including new treatment plant for removal of iron. Bond issue of about $31,000 is being arranged for work.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / ↓ Product	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢													
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3 05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG Special coated (Per base box)	$4.30		$4 30						$4.40						
BARS															
Soft steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet)[7]	1.90¢	1.90¢	1.90¢	1.90¢	1.90¢	1.90¢	1.90¢	1.90¢			2.25¢	2.30¢	2.00¢		
Reinforcing (rail)[7]	1.80¢	1.80¢	1.80¢	1.80¢	1.80¢	1.80¢	1.80¢				2.15¢	2.20¢	1.90¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢										
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢										
Spring	3.20¢	3.20¢		3.20¢	3.20¢										
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS															
Common		2.25¢			(Terra Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in to 8 in.	$54.00
8 in. to 12 in.	52.00
12 in to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the making of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

	Base per 100 Lb.
Annealed fence wire	$3.05

	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	56
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. to 1½ in. inclusive	62
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. through 1½ in.	62	62
1⅝ in. and larger	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	72½
Stove bolts in packages, with nuts attached, add 15% extra.	
Stove bolts in bulk	83½

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	June 5	June 6	June 7	June 8	June 10	June 11
Copper, Electrolytic[1]	11.50	11.50	11.50	11.50	11.50	11.50
Copper, Lake	11.50	11.50	11.50	11.50	11.50	11.50
Tin, Straits, New York	54.125	53.75	54.25	.....	55.75	57.00
Zinc, East St. Louis[2]	6.25	6.25	6.25	6.25	6.25	6.25
Lead, St. Louis[3]	4.85	4.85	4.85	4.85	4.85	4.85

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	57.50	56.50
Copper		
Lake	13.25	12.625
Electro	12.75	12.625
Castings	12.375	12.375
H. R. sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow, sheets*	18.31	18.31
Yellow, rods*	13.26	13.26
Seamless tubes*	21.06	21.06
Zinc		
Slabs	7.60	7.75
Sheets, No. 9 casks	12.00	12.00
Lead		
American pig	6.10	5.50
Bar	8.05	8.25
Cut sheets	8.25	8.25
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.50	21.50
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	34.50	32.50
Babbitt		
Anti-friction grade	22.50	22.00

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	9.25	9.875
Hvy. and wire	8.25	8.625
Light and bottoms	7.25	7.75
Brass		
Heavy	5.125	5.625
Light	4.125	4.875
No. 1 yel. turn.	4.50	5.50
No. 1 red or compo. turn	7.75	8.25
Hvy. mach. compo.	8.00	8.625
Lead		
Heavy	4.00	4.375
Aluminum		
Cast	8.50	9.50
Sheet	13.50	14.50
Zinc	3.25	4.00

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 19c.-20c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $197-$200 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 12.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

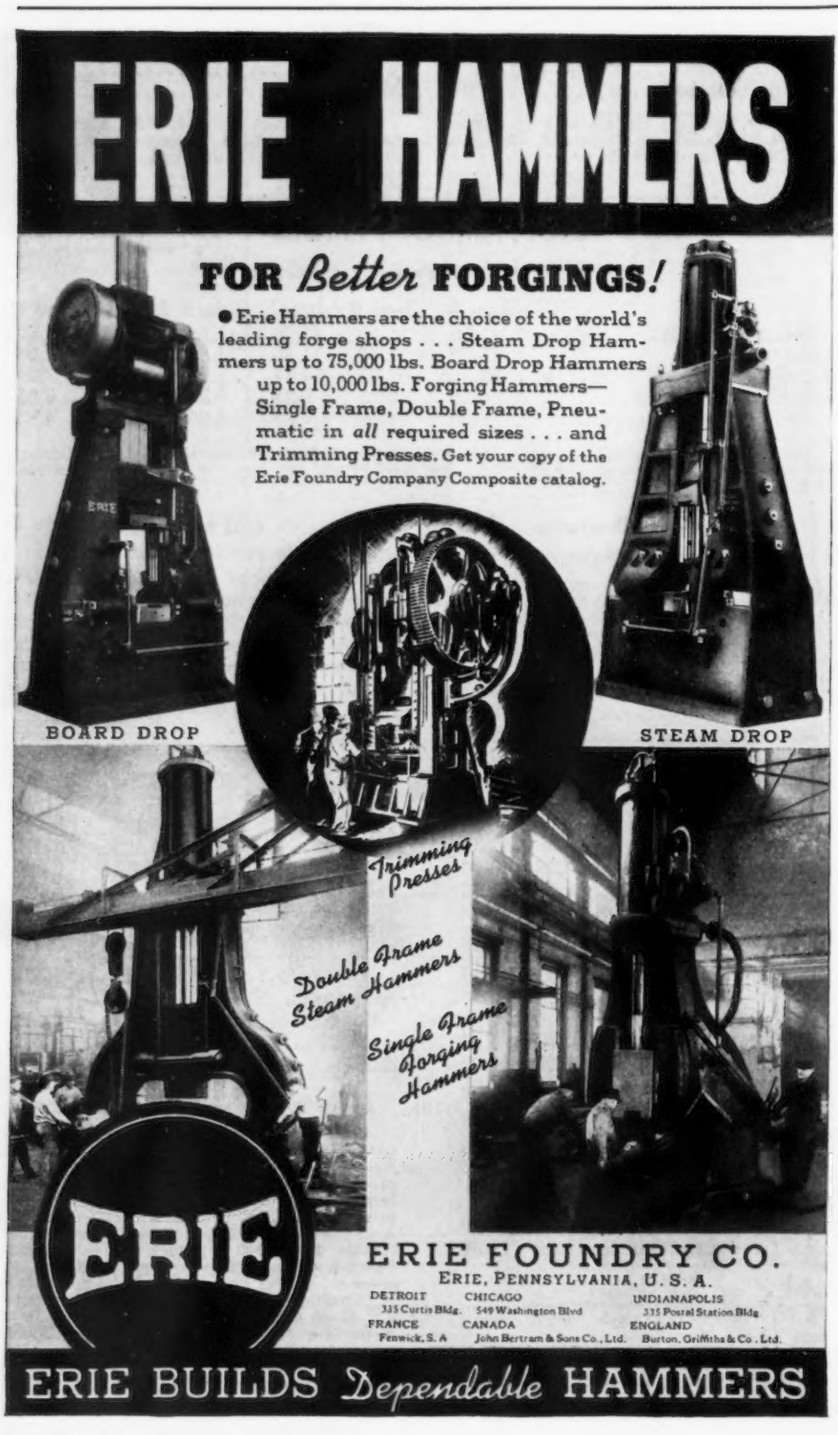
Open-hearth grade ..... 2.70c.
Delivered, Detroit ..... 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.


ERIE HAMMERS
FOR Better FORGINGS!
● Erie Hammers are the choice of the world's leading forge shops . . . Steam Drop Hammers up to 75,000 lbs. Board Drop Hammers up to 10,000 lbs. Forging Hammers—Single Frame, Double Frame, Pneumatic in all required sizes . . . and Trimming Presses. Get your copy of the Erie Foundry Company Composite catalog.
BOARD DROP
STEAM DROP
Trimming Presses
Double Frame Steam Hammers
Single Frame Forging Hammers
ERIE
ERIE FOUNDRY CO.
ERIE, PENNSYLVANIA, U. S. A.
DETROIT 335 Curtis Bldg.
CHICAGO 549 Washington Blvd
INDIANAPOLIS 335 Postal Station Bldg
FRANCE Fenwick, S. A
CANADA John Bertram & Sons Co., Ltd.
ENGLAND Burton, Griffiths & Co., Ltd.
ERIE BUILDS Dependable HAMMERS

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

	No. 304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H't strip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 15c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d. 13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½

Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+30
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60
Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39½	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

The economy of Kinnear Rolling Doors is twofold! First, their convenient, space-saving, upward action reduces operating costs. Second, their rugged, durable, all-steel construction keeps maintenance costs down!

Consider the extra value you get in these Kinnear Door advantages! They permit full use of all floor and wall space around the opening. They open out of reach of damage by wind, trucks, or other vehicles. They are counterbalanced for smooth, easy operation — and they're never hampered by snow, ice or swollen ground. They offer all-metal protection against fire, weather, riot, theft and intrusion. And every Kinnear Rolling Door is custom-built for easy installation and better operation. Motor operation is available. Write today for full information.

Send for this **1940 CATALOG!**

The **KINNEAR** *Manufacturing Co.*
1760-80 FIELDS AVE., COLUMBUS, OHIO
Offices and Agents in all Principal Cities
FACTORIES: COLUMBUS, OHIO; SAN FRANCISCO, CALIF.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, bessemer, 51.50%..	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%....	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

	Per Unit
Algerian, low P, Cu free, dry, 55 to 58% Fe.....	14c.
Caucasian, washed, 52% Mn...	50c.
African, Indian, 44 to 48% Mn.	46c.
African, Indian, 49 to 51% Mn.	49c.
Brazilian, 46 to 48% Mn.....	47c.
Cuban, del'd, duty free, 51% Mn	62c.

	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$23.00 to $23.50
Tungsten, domestic scheelite, delivered	23.00 to 23.50
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)..	$19.00
Rhodesian, 45%.....	22.00
Rhodesian, 48%.....	26.00 to 27.00

*All foreign ore prices are nominal. War conditions have prevented trading in Swedish and Turkish ores and all quotations have therefore been withdrawn.

FINISHING COSTS TOO HIGH? THEN -READ THIS!

PITTSBURGH Plate Glass Company's Spiral Wound Brushes are saving money for many manufacturers of light gauge metal. By speeding up production—by reducing finishing costs—by providing a product of more uniform quality!

Investigate! Consult with our representatives. They will help you develop Spiral Wound Brushes —of horsehair, tampico, or nickel silver wire—to meet your particular finishing requirements.

PITTSBURGH
PLATE GLASS COMPANY
BRUSH DIVISION · BALTIMORE, MD.

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.....	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast.....	2.30c.
Track bolts, steam railroads...	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)...	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail.....	$20.00
Domestic, f.o.b. Ohio River landing barges	20.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..	$20.50 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid....	$25.00 to $25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....	$31.00
As above, in bags, f.o.b. same mines	$32.60

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis..	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey.....	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois.....	42.75
Second quality, New Jersey....	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton.....	7.10

Silica Brick

Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester...	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$100.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$32.00
Domestic, 26 to 28%..... 39.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$69.50*
50% (ton lots, packed)..... 82.00*
75% (carload lots, bulk).....126.00*
75% (ton lots, packed) 142.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.
For each unit of manganese over 2%, $1 per ton additional.
Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.
Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $98.00*
2.50% carbon 103.00*
2% carbon 108.00*
1% carbon 118.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V., del'd $2.70 to $2.90†
Ferracolumbium, per lb. contained columbium, f. o. b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton $58.50
Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J.....4.75c.
No. 6, f.o.b. Bayonne, N. J.....3.21c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland.5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.3.75c.
No. 6 industrial, del'd Cleveland.3.25c.

Stearns Drill Stand Magnet

for **MAGNETIC EQUIPMENT** of ANY KIND Consult

Stearns **MAGNETIC**

Stearns Hand Magnet

The STEARNS Drill Stand Magnet, a profitable investment for steel and iron fabricators. Provides greater accuracy in drilling, saw hole cutting, etc. . . . increases operator output with less fatigue. Fits any standard old man stand, easily attached, holds with tenacious grip in any position. Will cut your fabricating costs.

The STEARNS Hand Magnet has many applications in laboratories, engineering departments, offices, for small capacity separation problems. Inexpensive in initial and maintenance cost. Our Bulletin 25-A will give you details.

Magnetic Equipment may be the very thing you need. Feel free to consult Stearns Magnetic headquarters on any problem. Avail yourself of our extensive laboratory facilities. It may be the means of saving considerable money for you.

Stearns Suspended Magnets in all sizes and shapes

STEARNS MAGNETIC MANUFACTURING CO.

635 S. 8th St. Milwaukee, Wis.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$4.00 to $4.25

Foundry, f.o.b. Connellsville, prompt .....$5.25 to 5.50

F'dry, by-product, Chicago.... 10.50

F'dry, by-product, New England 12.50

Foundry, by-product, Newark or Jersey City .....$11.30 to $11.90

F'dry, by-product, Philadelphia 11.13

F'dry, by-product, Cleveland... 11.05

F'dry, by-product, Cincinnati.. 10.50

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export. £17 18s.

Tin plate, per base box 32s. to 33s.

Steel bars, open hearth 13£ 9s.

Beams, open hearth.... 12£ 2s. 6d.

Channels, open hearth.. 12£ 2s. 6d.

Angles, open hearth.... 12£ 2s. 6d.

Black sheets, No. 24 gage 17£ max.*; 17£ min.**

Galvanized sheets, No. 24 gage 19£ 10s. max.*; 19£ 10s. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$24.50***	***$24.00***	***$25.50***	***$25.00***	.....
Brooklyn	***26.50***	.....	.....	***27.00***	.....
Jersey City	***25.53***	***25.03***	***26.53***	***26.03***	.....
Philadelphia	***24.84***	***24.34***	***25.84***	***25.34***	.....
Bethlehem, Pa.	$24.00	$23.50	$25.00	$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa.	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	***23.44***	***23.61***	.....	***24.11***	.....
Canton, Ohio	***24.39***	***23.89***	***24.89***	***24.39***	.....
Mansfield, Ohio	***24.94***	***24.44***	***25.44***	***24.94***	.....
St. Louis	***23.50***	***23.02***	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	.....	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	***25.63***	.....	***26.13***	***25.63***	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	***26.50***	.....	.....	.....	.....
Provo, Utah	21.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$22.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.15	$3.05	$3.15	$3.35	$3.38	$3.23	$3.05	$3.51	$3.45	$3.18	$3.30	$3.48	$4.10
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	....	4.12	4.35	4.43	6.30
Sheets, galvanized	4.75	4.60	4.42	4.50	4.30	4.64	4.45	4.66	4.75	4.95	5.00	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	....	3.41	3.63	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.

TIME spent in resharpening or replacing the reamer cuts the savings made possible by new machines. For clean, accurate holes, for longer time between resharpenings, for the ability to keep pace with today's machine tools, specify Morse Reamers.

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Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

● **General Electric Co.,** Schenectady, N. Y., plans new one-story plant, 35 x 120 ft., at Andover, Ohio, to be operated in conjunction with works at Cleveland. Cost over $50,000 with equipment.

Carbide & Carbon Chemicals Corp., 30 East Forty-second Street, New York, has approved plans for a new branch plant on 200-acre tract near Texas City, Tex., for production of synthetic organic chemicals, using refinery gases as base, to be secured from plant of Pan-American Refining Corp., in immediate vicinity. Also will build steam power house, machine shop, compressor station and other structures. Cost close to $1,500,000 with machinery. Ford, Bacon & Davis, Inc., 39 Broadway, New York, is engineer and will supervise erection.

J. F. Waters Motor Sales Corp., 211-25 West Sixty-first Street, New York, manufacturer and distributer of taxicabs, has leased block of property bounded by Thirty-third and Thirty-fourth Streets, Forty-seventh Avenue and Queens Boulevard, Long Island City, improved with three-story building, 75 x 200 ft., and one-story structure, 200 x 200 ft., about 85,000 sq. ft. of floor space, for new plant for parts production and assembling, with service, repair and sales departments. Present works will be removed to new location and increased capacity carried out. Cost over $500,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until June 19 for 350,000 ft. of cable and reels (Circular 485); until June 20, tape pullers and rewinding reels, recording equipments, etc. (Circular 503).

Air Associates, Inc., Garden City, N. Y., aircraft parts and equipment, plans new one and two-story and basement plant at Bendix, N. J. Cost over $125,000 with equipment.

Rheem Mfg. Co., 30 Rockefeller Plaza, New York, steel barrels and containers, gas appliances, etc., will begin superstructure for new one-story branch plant at Sparrows Point, Baltimore, for which structural steel award was let recently to Bethlehem Steel Co. Cost over $60,000 with equipment.

Larchmont-Mamaroneck Joint Garbage Disposal Commission, Municipal Building, Larchmont, N. Y., asks bids until June 18 for incinerator plant. Henry W. Taylor, 11 Park Place, New York, is consulting engineer.

Metal & Thermit Corp., 120 Broadway, New York, thermit welding equipment, etc., has let general contract to Austin Co., Cleveland, for one-story addition to branch plant at East Chicago, Ind. Cost about $200,000 with equipment.

Pleasant Valley Packing Co., 586 Broadway, Schenectady, N. Y., food products, plans three-story and basement addition, 65 x 100 ft. Cost over $65,000 with equipment. Worcester Engineering Co., 88 Tremont Street, Boston, is consulting engineer.

Curtiss-Wright Corp., 30 Rockefeller Plaza, New York, airplanes and parts, has plans for new plant at Caldwell, N. J., for production of bombers and other type military aircraft for Government. Cost over $1,500,000 with equipment.

American Stores Co., 424 North Nineteenth Street, Philadelphia, food products, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for one-story storage and distributing plant at Kearny, N. J. Cost close to $400,000 with conveyors, loaders and other equipment.

Standard Pressed Steel Co., Stewart and Kenmore Avenues, Jenkintown,, Pa., pressed steel products, steel shop equipment, etc., has let general contract to Townsend, Schroeder & Wood, Inc., 1700 Sansom Street, Philadelphia, for one-story addition, to be used as a machine shop. Cost over $50,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Bridesburg, Philadelphia, asks bids until June 21 for telescope mounts, range quadrants, spare parts, etc. (Circular 1508).

Buffalo District

● **Scintilla Magneto Co.,** Sidney, N. Y., magnetos and other precision equipment for aircraft has let general contract to Frank Lewis & Son, Bainbridge, N. Y., for three one-story additions, 60 x 450 ft., 100 x 200 ft., and a smaller structure. Cost over $125,000 with equipment.

Bell Aircraft Corp., 2050 Elmwood Avenue, Buffalo, military and other airplanes and parts, has leased about 120,000 sq. ft. additional space in above building, for expansion in parts production and assembling divisions, bringing plant occupancy to 440,000 sq. ft. Cost close to $600,000, majority of fund to be expended for equipment.

New England

● **Botwinik Brothers, Inc.,** 67 Water Street, New Haven, Conn., used machine tools, plans new one-story plant, 60 x 620 ft., with lean-to extension, 30 x 620 ft., at North Haven, for rebuilding and reconditioning used machinery, parts production and reassembling. Cost over $75,000 with equipment. Charles H. Abramowitz, New Haven, is architect.

United Electric Railways Co., 24 Exchange Place, Providence, R. I., has asked bids on general contract for one-story motor bus service, repair and garage building, 75 x 250 ft. Cost close to $80,000 with equipment.

Public Works Officer, Navy Yard, Boston, asks bids (no closing date stated) for modernization and extensions in power house, radio direction finder station, and other structures at Naval radio station, Cape Elizabeth, Me. (Specifications 9265); also bids (no closing date stated) for similar work at Naval radio station, Scituate, Mass. (Specifications 9266).

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., has leased part of local mill of Hartford Rubber Works Division of United States Rubber Co., for electrical products division, which will be removed from main plant to new location and capacity increased. This change will release about 100,000 sq. ft. of floor space at main works for machine gun and other firearms manufacture, parts production and assembling.

Washington District

● **Public Buildings Administration,** Federal Works Agency, Washington, has let general contract to John McShain, Inc., Philadelphia, at $2,177,200 for new terminal building, steel hangar with repair and reconditioning facilities, and steam power house at Washington airport, Gravelly Point, Va.

Rustless Iron & Steel Corp., 3400 East Chase Street, Baltimore, has let general contract to Cummins Construction Corp., 803 Cathedral Street, for one-story addition, 220 x 227 ft., for expansion in melting division. Cost over $200,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for turbine and motor-driven pumps; fuel oil pumping, heating and storage equipment; heat exchangers, distilled and feedwater storage tanks, air filters, de-superheaters, steel stacks, special valves, instruments, piping system, etc., for power plant at Pearl Harbor Navy Yard, T. H. (Specification 9509); also bids (no closing date stated) for extensions and improvements in steel hangar at Naval Air Station, Anacostia, Washington (Specification 9858).

Calvert Distillers Corp., 405 Lexington Avenue, New York, has let general contract to Consolidated Engineering Co., 20 East Franklin Street, Baltimore, for four-story addition to branch plant at Relay, Md., for storage and distribution. Cost about $85,000 with equipment. Smith, Hinchman & Grylls, Inc., Marquette Building, Detroit, is architect and engineer.

Constructing Quartermaster, Holabird Quartermaster Depot, Baltimore, asks bids until June 25 for shop buildings and ordnance school at Aberdeen Proving Grounds, Aberdeen, Md. (Circular 6240-59).

General Purchasing Officer, Panama Canal, Washington, asks bids until June 17 for four steam boiler feed pumps, galvanized steel eye bolts, galvanized steel ring bolts, galvanized turnbuckles and welding rods (Schedule 4091) four 25-ton screw jacks, brass steam whistles, water gages, relief valves, grease cups, priming cups and other equipment (Schedule 4094).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 18 for aluminum-alloy metallic ladder treads (Schedule 1855) for Mare Island Navy Yard and San Diego Naval Air Station, Cal.; two typesetting machines (Schedule 1861) for Puget Sound Navy Yard.

South Atlantic

● **Georgia Power Co.,** Atlanta, Ga., has approved plans for addition to Atkinson steam-electric generating station, on Chattahoochee River, near Atlanta, 126 x 142 ft., installation to include new 100,000-hp. turbine-generator units, high-pressure boilers and auxiliary equipment. Plant output will be doubled. Cost close to $3,000,000.

Commanding Officer, Ordnance Department, Augusta Arsenal, Augusta, Ga., asks bids until June 19 for one motor-driven precision tool room lathe (Circular 52).

Carolina Paper Board Corp., 528 Turner Avenue, Charlotte, N. C., has let general contract to R. C. Hicks, Piedmont Building, for one-story addition for storage and distribution. Cost close to $40,000 with equipment. Southern Engineering Co., Charlotte, is engineer.

Western Pa. District

● **Westinghouse Electric & Mfg. Co.,** East Pittsburgh, has let general contract to United Building Construction Co., 246 South Twenty-second Street, Philadelphia, for three-story and basement addition, 120 & 300 ft., to branch plant at Essington, near Philadelphia, used for production of steam turbines and parts. Cost over $175,000 with equipment. Hunting, Davis & Dunnells, Century Building, Pittsburgh, are architects.

Falk & Co., Rosslyn Station, Pittsburgh, processed oil products for paint and other industries, have acquired former bulk storage and distributing plant of Sinclair Refining Co., Bay Avenue and Wheeler Point Road, Newark, N. J., for Eastern branch plant for storage and distribution. Present steel tank facilities will be increased and new buildings erected. Cost over $75,000 with equipment.

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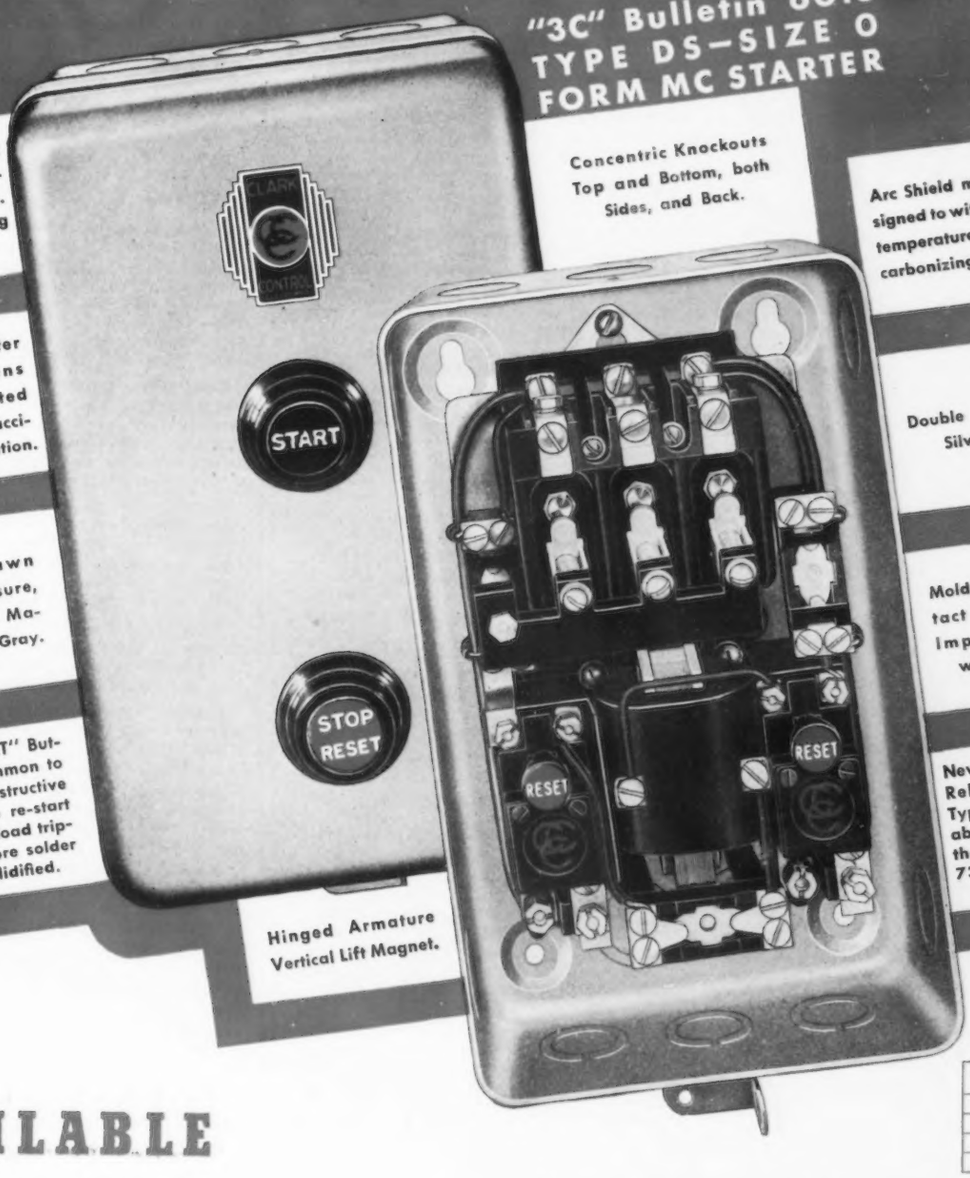

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Large Diameter Push Buttons fully protected to prevent accidental operation.

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Molded moving contact holder made of Impact Bakelite to withstand shock.

"STOP-RESET" Buttons are common to prevent destructive attempts to re-start after overload tripping, before solder has solidified.

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Hinged Armature Vertical Lift Magnet.

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220	1½	2
440	1½	2
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With normally open or normally closed control circuit contacts.

In single phase or polyphase types.

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South Central

● **United States Gypsum Co.,** 300 West Adams Street, Chicago, building products, has let general contract to Campbell-Lowrie-Lautermilch Corp., 400 West Madison Street, for one-story addition to branch mill at Greenville, Miss., for storage and distribution. Cost close to $50,000 with equipment.

Tennessee Coal, Iron & Railroad Co., Brown-Marx Building, Birmingham, has let general contract to C. C. Wiborn Construction Co., 2007 Avenue J, for one-story additions to mill, including pulverizer house, acid plant, chemical building and other structures. Cost over $85,000 with equipment.

Morningside Chemical Co., Chattanooga, Tenn., industrial chemicals, will ask bids soon on general contract for new one-story plant on Holtzolaw Avenue. Cost about $125,000 with equipment. Crutchfield & Law, 809 Pine Street, are architects.

Louisiana Coca-Cola Bottling Co., Thibodaux, La., has let general contract to John C. Corbin, Houma, La., for one-story addition, 55 x 100 ft., for storage and distribution. Cost close to $40,000 with equipment. Douglas V. Freret, Union Building, New Orleans, is architect.

Southwest

● **Cessna Aircraft Co.,** Wichita, Kan., airplanes and parts, has let general contract to Walter Armogast, Kauffman Building, for one-story addition to plant near city limits, 100 x 250 ft., for expansion in assembling department. Cost over $70,000 with equipment. Overend & Boucher, Brown Building, are architects.

Missouri Boiler & Sheet Iron Works, 908 South Twenty-third Street, St. Louis, boilers, tanks and other products, has let general contract to W. C. Harting Construction Co., 722 Chestnut Street, for one-story addition, 80 x 90 ft. Cost close to $40,000 with equipment.

McCabe-Powers Auto Body Co., 1217 North Broadway, St. Louis, has let general contract to Fruin-Colnon Contracting Co., Merchants' Laclede Building, for new one-story plant, 50 x 350 ft., at 5926 North Broadway. Cost over $85,000 with equipment.

Sinclair Home Coal Co., 1012 Baltimore Avenue, Kansas City, Mo., plans one-story coal mining, storage and distributing plant, 100 x 150 ft., and smaller structures, at coal-mining properties, Tiger, Mo. Cost over $65,000 with equipment. Robert J. Raney, 293 Union Station Building, Kansas City, is architect.

Swift & Co., Cotton Oil Mill Division, 4115 South Packers Street, Chicago, plans new cottonseed oil mill at Portageville, Mo., with power house, machine shop and other structures. Cost close to $100,000 with equipment.

Magnolia Petroleum Co., Magnolia Building, Dallas, Tex., has approved plans for expansion and modernization in oil refinery at Fort Worth, including new catalytic polymerization unit, cracking machinery for gasoline division and other equipment. New steel tanks will be installed, with other storage and distributing facilities. Large part of new equipment will be used for production of high-test aviation gasoline. Cost over $2,000,000 with machinery.

Ohio and Indiana

● **Columbus Show Case Co.,** 826 West Fifth Avenue, Columbus, Ohio, display cases, store equipment, etc., has let general contract to Austin Co., Cleveland, for one-story addition, 87 x 136 ft. Cost over $75,000 with equipment.

Kraft-Phenix Cheese Corp., 500 North Peshtigo Street, Chicago, will take bids at once on general contract for new one and two-story factory branch, storage and distributing plant at 2044-50 Lakeside Avenue, Cleveland. Cost about $150,000 with equipment. Cleveland offices are at 3542 Croton Avenue South. H. W. Martenson is engineer in charge, first noted address.

Warner & Swasey Co., 5701 Carnegie Avenue, Cleveland, machine tools and parts, has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for a second plant extension, one-story, about 20,000 sq. ft. of floor space, to adjoin a one-story unit, 144 x 213 ft., now in course of erection. Entire project will provide about 50,000 sq. ft. additional floor space for production. Cost over $225,000 with equipment. Osborn Engineering Co., 7016 Euclid Avenue, is consulting engineer.

Haynes Stellite Co., Kokomo, Ind., metal alloys, special tools, etc., has let general contract to H. G. Christman Construction Co., 508 North Notre Dame Avenue, South Bend, Ind., for one-story addition, 75 x 132 ft. Cost close to $50,000 with equipment. Oscar Cook, Lincoln Building, Kokomo, is architect; Charles R. Ammerman, Century Building, Indianapolis, is consulting engineer.

Contracting Officer, Quartermaster Corps, Jeffersonville, Ind., asks bids until June 18 for wrenches, screwdrivers, filter disk cans, wire brushes, screws, generators, air pressure gages, air pumps and other equipment (Circular 431-231).

Michigan District

● **All-Metal Products Co.,** Wyandotte, Mich., steel toys and other steel specialties, has let general contract to Edward Schendel & Co., Wyandotte, for one-story addition, 60 x 200 ft., for storage and distribution. Cost close to $45,000 with equipment. Carlton P. Campbell, Wyandotte, is architect.

H. & H. Tube & Mfg. Co., 261 Scotten Street, Detroit, metal tubing and kindred products, plans one-story addition. Cost about $40,000 with equipment. Talmage C. Hughes, 120 Madison Street, is architect.

Wayne County Road Commissioners, Barlum Tower Building, Detroit, plans new steel hangar with repair and reconditioning facilities at Wayne County airport, especially designed for military aircraft.. Cost about $100,000 with equipment.

Yellow Truck & Coach Mfg. Co., Pontiac, Mich., has let contract to Whitehead & Kales Co., River Rouge, Detroit, for superstructure for one-story addition, 120 x 400 ft. Cost over $175,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Middle West

● **Chicago Smelting & Refining Corp.,** 2547 South Loomis Street, Chicago, will take bids soon on general contract for one-story addition, 60 x 275 ft., to be used as a foundry. Aetna Engineering Works, 12,001 South Calumet Avenue, is engineer. Cost over $80,000 with equipment.

Pipe Line Service Corp., 205 West Wacker Drive, Chicago, pipe line equipment, has let general contract to Abell Howe Co., 53 West Jackson Boulevard, for one-story addition to branch plant at Franklin Park, Ill. Cost close to $45,000 with equipment.

Bradley Washfountain Co., 2203 West Michigan Street, Milwaukee, metal washing fixtures, showers, etc., has let general contract to Dahlman Construction Co., Milwaukee, for two-story addition, 60 x 90 ft. Cost close to $50,000 with equipment. Federal Engineering Co., 720 North Jefferson Street, is consulting engineer.

City Council, Brooklyn, Iowa, asks bids until June 25 for new municipal power plant, installation to include two 200-kw. diesel engine-generator sets, one 75-kw. generating unit and auxiliary equipment. Cost about $135,000. Stanley Engineering co., Muscatine, Iowa, is consulting engineer.

Sinko Tool & Mfg. Co., 351 North Pulaski Road, Chicago, sheet metal stampings, cigar lighters and kindred specialties, has asked bids on general contract for one-story top addition to present plant. Cost over $40,000 with equipment. Westcott Engineering Co., 205 West Wacker Drive, Chicago, is consulting engineer.

City Council, West Bend, Iowa, asks bids until June 27 for extensions and improvements in municipal power plant, including new 325 to 425 bhp. diesel engine unit and auxiliary equipment. A. S. Harrington, Baum Building, Omaha, Neb., is consulting engineer.

Pacific Coast

● **North American Aviation, Inc.,** 5701 Imperial Highway, Venice, Los Angeles, airplanes and parts, has let general contract to Austin Co., Washington Boulevard, for two one-story additions, 75 x 420 ft., for parts production and general assembling, and 40 x 60 ft., for expansion in drop hammer department. Cost over $100,000 with equipment.

Loose-Wiles Biscuit Co., 832 Sansome Street, San Francisco, is erecting new one-story and basement plant at Oakland, Cal. Cost over $1,500,000 with traveling ovens, mixers, conveyors and other equipment. Main offices are at 1100 West Eighth Street, Kansas City, Mo.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until June 19 for motor-driven pumps, motor-operated sluice gates, sewage tanks, piping and other equipment for dry dock No. 4, Mare Island Navy Yard (Specification 9800).

West Paint Co., 825 Valencia Street, San Francisco, paints, varnishes, oils, etc., has asked bids for one-story addition, 75 x 100 ft. Cost over $40,000 with equipment.

Board of Trustees, Western Washington College of Education, Sehome Hill, Bellingham, Wash., plans extensions and improvements in power house, including additional equipment. Fund of about $200,000 has been arranged for this and other buildings. Charles H. Webb and John P. Jones, Hoge Building, Seattle, are architects.

Baker Oil Tools, Inc., 6000 South Boyle Avenue, Vernon, Los Angeles, oil well equipment and supplies, has let general contract to Ford J. Twaits Co., 816 West Fifth Street, for one-story addition. Cost close to $40,000 with equipment. Earl Heitschmidt, Subway Terminal Building, is architect.

Pacific Power & Light Co., Portland, plans expansion and improvements in hydroelectric power plant on Crooked River, Cove, near Bend, Ore., including additional equipment. Cost about $200,000 with machinery. Project will be carried out in cooperation with Bureau of Reclamation, Denver, which is constructing dams on Upper Deschutes River in same area.

Canada

● **Canadian Sugar Factories, Ltd.,** Raymond, Alta., plans new beet sugar mill on local site, including storage and distributing structures, power house, machine shop and auxiliary buildings. Cost over $200,000 with machinery. A similar mill will be built at Chin, Alta., where negotiations for site are under way, to cost about a like amount. F. H. Ballou, engineer for British Columbia Sugar Refinery, Ltd., 7 Rogers Street, Vancouver, B. C., is consulting engineer.

St. Thomas Bronze Co., Ltd., Canada Cement Building, Montreal, bronze and brass products, has begun one-story addition to branch plant at St. Thomas, Ont., for which general contract recently was let to Green Lumber Co., Ltd., 1 White Street, St. Thomas. Cost close to $50,000 with equipment.